RAILROAD GAZETTE

FRIDAY, SEPTEMBER 30.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Chicago & Eastern Illinois; Housatonic; Minneapolis & St. Louis; Lake Erie & Western; Cumberland Valley.

Elections.—Cincinnati Richmond & Chicago, T. D. Messler, President.—Kanawha & Ohio, Nelson Robinson, President.—Kansas, Missouri, Arkansas & Natchez, I. L. Tilley, President.—Winona & Southwestern, E. S. Youmans, President.

New Companies Organized.—Grand Rapids & Chicago is incorporated in Michigan.—Knoxville Belt Line files articles in Tennessee.—North & South Short Line is incorporated in Georgia.—Paducah, Chickasaw & Birmingham is incorporated in Alabama.—San Francisco & Joaquin Valley is incorporated in California.—San Diego & Cuyamanca is incorporated in California.

Changes and Extensions.—*Arkansas:* Fort Scott, Natchez & New Orleans will begin work. Pine Bluff, Monroe & Texas is making survey.—*Dakota:* Duluth and Manitoba is completed to Drayton. Chicago & Northwestern is extended from Faulkton to Gettysburgh.—*Indiana:* Louisville, New Albany & Chicago will build branch.—*Montana:* Helena & Boulder Valley will begin work.—*Missouri:* Kansas City & Southern will build from Kansas City to East Lynne.—*Ontario:* Port Arthur, Duluth & Western will begin work.—*Texas:* Fort Worth & Denver City will build branch to Panhandle. San Antonio & Aransas Pass will extend to Llano. Austin & Northwestern will extend to Llano.—*Vermont:* Central Vermont begins Barre branch.—*Wisconsin:* Minneapolis, Sault Ste. Marie & Atlantic is extending to Gladstone, Mich., from Gagen. Milwaukee, Lake Shore & Western will build to Winona.

Traffic.—Anthracite coal shipments for the week ending Sept. 24 show decrease of 16.2 per cent. as compared with corresponding week last year; bituminous shipments show increase of 10.2 per cent. Cotton receipts, interior markets, for week ending Sept. 23, show an increase of 77.9 per cent. as compared with corresponding week last year; shipments show increase of 50.1 per cent.; seaport receipts sho wincrease of 76.1 per cent.; exports an increase of 32.3; cotton in sight is greater than at same date last year by 18.7 per cent.

Miscellaneous.—Kentucky & South Atlantic is sold.

Contributions.

The Strong Locomotive.

NEW YORK, Sept. 26, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your editorial comment in your last week's issue, in which you say (meaning the writer), "He seems to prefer the method used in the test of his own locomotive, where the judgment of the experimenter took the place of an accurate measurement of coal." I would say that the coal was accurately weighed as stated in Mr. Coon's report to Mr. Leavitt, which you published in your issue of the 16th inst., and the only ground for any criticism or room for your remark arises from the fact that ash and clinker was not weighed; and here some explanation is perhaps necessary. It was desired to test these locomotives under the ordinary conditions of work on the Lehigh Valley, and in regular working the fires are never drawn except in case of repairs being required, or for washing out when the boiler is required to be cool. When a locomotive has made a round trip the fires are cleaned, the ashes dumped and the fires banked and covered over, and the engine stands with a cover over the stack until immediately prior to going out on another trip, when the fire is leveled down and covered over with coal; the blower is put on and steam raised, when the engine is ready to go out.

Now the test was conducted substantially under these conditions, the only variation being that after the fires had been banked with the coal that was weighed and charged against the locomotive the remaining coal was weighed back and credited, and a small amount was thrown in the tender to be used by the hostler to keep up the fire during the night and to spread over the fire before starting on the next trip. This coal was not weighed, because the locomotives were out of the hands of the experts while in the round-house, and a greater or less quantity of coal might have been used by the men in charge, who were not responsible, and care was taken to see that the fireman did not have on more than the usual fire before starting. As a matter of fact, it would not have done for a fireman to have on more than his usual fire at starting, for if he had his engine would not have steamed when going over the mountains, and as it was a contest of speed, up the 12 miles of 96 ft. grade, in which the firemen and engineers were more interested than in the question of fuel consumption, they were careful to have the fires of proper thickness. This, with Nos. 357 and 383, which had ordinary fire-boxes, was about 8 in. at the fire door and 12 in. at the tube sheet, and in No. 444 about 5 in. level fire was carried, for she steamed better with a light fire. On the return the steam pressure was maintained right up to the end of the run, and no attempt made at running the fire out at the end. For purposes of comparison this was deemed a sufficiently accurate method as it was honestly conducted as between the different locomotives, under the supervision of visiting as well as assisting experts from the Pennsylvania and New York, Lake Erie & Western.

As compared with outside tests as far as getting a high efficiency and making a big showing are concerned, it would have been better to weigh the ash and clinker, of which there was a large percentage. This deducted from the coal would have shown a much higher rate of evaporation per pound of combustible.

GEO. S. STRONG.

Premiums to Employes.

(*Continued.*)

PREMIUMS FOR ECONOMIES IN FUEL AND LUBRICANTS.

Various companies of Belgium, Austria-Hungary, Wurtemburg and Spain give premiums to drivers and firemen by crediting to them a certain percentage of the economy in fuel and lubricants which they may make. A certain quantity of fuel and lubricants is allotted to each engine, according to the service required of it. Oil is ordinarily given out at a certain quantity per train mile, but the Western Railroad of France makes a variable allotment, depending upon the speed of the trains and the profile of the line. The allotment of fuel varies with the style of engine, the profile of the line and the season. It is fixed either by the weight or by the number of vehicles hauled.

On the Belgian state roads 278 pounds of fuel is allowed for kindling and 165 more as a fixed quantity while pressure is kept up, and the following variable allowance is made:

Single pair of drivers,	6.34	lbs.	per mile.
4 wheels, coupled,	8.80	"	"
6 " "	11.62	"	"
8 " "	13.02	"	"

An allowance of 8.9 lbs. per mile is also made for grades steeper than 21 ft. per mile. Beyond that the allowance is calculated by the following formulæ:

For express trains,

$$\frac{K\ 183\ Sl + Sl\ (0.0843\ V \pm i)}{1.83 + 0.0843 \times 75.}$$

For ordinary passenger trains,

$$\frac{K'\ 183\ Sl + Sl\ (0.0843\ V \pm i)}{1.83 + 0.0843 + 60}$$

For freight and mixed trains,

$$\frac{K''\ 183\ Sl + Sl\ (0.0843\ V'' \pm i)}{1.83 + 0.0843 \times 30}$$

In the formulæ i is the grade in millimetres per meter, l the length of the grade i, and the terms 75, 60 and 30 in the denominators are the speeds on straight and level lines of express trains, ordinary passenger and freight trains, respectively. The term $1.83 + 0.0843\ V$ represents the resistance per ton upon a straight and level line. K, K', K'' are co-efficients of the consumption of fuel per unit load per kilometer on a straight and level line. From experience it is found that these co-efficients should be given the value of 19, 18 and 10.5, respectively, in order that the drivers may make an economy of about 8 per cent.

The value of i is equated for curvative for ordinary passenger or freight trains, but not for express trains. The corrections for freight trains are a follows:

1,000 meters radius	=	0.12	per cent.	grade.	
900 " "	=	0.15	"	"	"
800 " "	=	0.15	"	"	"
500 " "	=	0.24	"	"	"
200 " "	=	0.60	"	"	"

This correction is taken at half the above value for passenger trains. The values of V are taken for freight trains:

Grade = 0.4	per cent.,	$V = 30.$
" 0.4 to 0.8	"	$V = 25.$
" 0.8 to 1.2	"	$V = 22.$
" 1.2 to 1.6	"	$V = 18.$
" 1.6 to 2.0	"	$V = 16.$
" over 2.0	"	$V = 14.$

For passenger trains the values of V are increased from 100 to 200 per cent for corresponding grades, and for express trains the values of V are still greater.

The coal saved beyond the sum of the allowances specified above is credited to the enginman at the rate of 60 cents the ton of 2,205 pounds.

On the Grand Central Railroad of Belgium the allowances of fuel are made per mile for locomotives hauling passenger or mixed trains, for locomotives of 4 or 6 wheels coupled, and for locomotives of 8 wheels coupled hauling freight trains. An allowance of 440 lbs. is made for starting fire for each engine which does not make 60 miles with one fire. Ten minutes of yard work is counted as 0.6 mile, and the corresponding allowance of fuel is 26 lbs. The premium given to enginemen is 60 cents per 2,200 lbs. of fuel saved. Any excess in the consumption of fuel above the allowance is charged to him at the rate of 20 cents per 2,200 lbs. The allowance for lubrication is 5.5 lbs. per 60 miles run for passenger and mixed trains, and 6.6 lbs. for freight trains. The premium for saving in lubricants is about 2.5 cents per 2.2 lbs., and a charge for consumption in excess of allowance is made at the same rate. The fireman receives premiums of one-third those given to the engineman.

On the State Railroads of Würtemberg fuel and lubricants are issued according to a fixed table. As coal, peat and wood are all used, a standard of equivalents is devised. For an economy of 220 lbs. of coal the engineman receives a premium, of 6 cents and the fireman 4 cents. On the Northern Austrian Railroad the allowances of fuel are based on mileage, weight of train, time of yard work, and time of standing with steam up. Three hundred and thirty pounds is allowed for starting the fire. The premiums are $1 per 2,200 of fuel, and 7.5 cents per 2.2 lbs. of lubricants. Fines are charged for consumption in excess of allowances. The premiums and the fines are divided between the engineman and the driver in the proportion of two-thirds to one-third.

On the Austrio-Hungarian state roads the allowance of fuel is based upon the mileage run by the engine and also upon the load hauled. This allowance depends upon the type of engine, the nature of the line and the season. One dollar and ten cents per ton (2,205 lbs.) for coal is allowed as premium, three-fourths paid to the engineman and one-fourth to the fireman. A premium of eight cents per 2.2 lbs. of lubricants saved is also paid, which is *equally* divided between the engineman and the driver.

On the Northern Railroad of Spain the allowances are fixed by the chief engineer of material and motive power, from experimental results. For each 2,205 lbs. of coal economized a premium of $2.50 is given, and a fine of $2 a ton (2,205 lbs.) is exacted for fuel burned in excess of the allowance. For lubricants a premium of six cents per 2.2 lbs. is given. The premiums and fines are divided between the engineman and the driver in the proportion of two-thirds to one-third.

On the French state railroads the allowances are based upon loads hauled, mileage run, yard work and time of standing under steam. The allowance for loads hauled varies with the profile of the line, the type of the engine and the load. This is fixed by the mileage and is divided into two parts, one for the locomotive and tender and the other for the weight of train hauled. The premium is $1.60 per 2,200 lbs. and the fine 60 cents. Premiums are also paid for economy in lubricants. Drivers receive one-fourth of the premiums.

On the Eastern Railroad of France allowances are made on each engine division and for each type of engine by train-mile, according to an experimental basis and a "normal" train. When the trains exceed the normal train an additional allowance of 500 grams is made for each vehicle per km. (say 1.75 pounds per mile), and the same allowance is made when the load exceeds a certain number of cars, depending upon the type of the engine, the profile of the line and the speed of the trains. A premium of 20 cents to the engineman and 10 cents to the fireman is given for trains running over certain grades without requiring assistance. The premium is calculated on the basis of $1.50 per ton for coke and $1.20 per ton of coal, and is divided at the rate of two-thirds for the engineman and one-third for the fireman. Any quarterly excess in the consumption of fuel which is 3.5 pounds per mile over the allowance causes a forfeiture of all the premiums accrued. The premium for economy in lubricants is 6 cents per 2.2 lbs., divided by the engineman and fireman, at the rate of one-third and two-thirds.

On the Western Railroad of France the basis of fuel allowance is, first, for an engine and five cars; second, for each car in excess; third, for an engine of 50 tons with a special allowance for each ton of excess on freight trains of small traffic and short runs; fourth, for an engine of 75 tons, with an allowance for excess of weight under the same conditions as number three. In order to calculate the premium of each engineman an average is taken of the trains which he has hauled during the month. The train is estimated by the number of carriages or by the ton, depending upon whether it is a passenger or a freight train. The premium per ton of fuel economized is one dollar and sixty cents for enginemen, eighty cents for apprentices and forty cents for firemen, and enginemen are charged one dollar a ton for the fuel consumed in excess of the allowance. A premium is also given of ten cents per 2.2 lbs. of lubricants saved, which is subject to the same fine for material used in excess of the allowance. This allowance is based upon the nature of the line run over and the speed of trains.

On the Northern Railroad of France allowances are made by train-mile calculated for a normal train, and these are augmented if additional cars are hauled. For example, the allowance for an express train, in the summer, of the normal type, is 19.8 lbs. with from one to three additional carriages it is 21.3 lbs., and for four additional carriages or more, it is 26.4 lbs., besides which a special money premium is paid for certain fast trains. The system on the Southern Railroad of France is very similar.

On the Lyons route the premium is $2 per ton of fuel saved. The allowance is calculated, first, upon a certain theoretical allowance for a standard train, with additional allowance according to the service made, which depends upon the load the speed, the profiles of the route and other elements. A fine of $2 per ton is exacted if the allowance is exceeded. A premium is also given for economy in lubricants.

Recent Westinghouse Tests at Burlington.

Last week some further tests were made at Burlington by the Westinghouse Air Brake Co. The course was that on which the tests of last May were made. The stops given here are said to be substantially the same as many others during the trials and to represent a fair average.

With a 50-car train, over the whole, course four emergency stops were as follows:

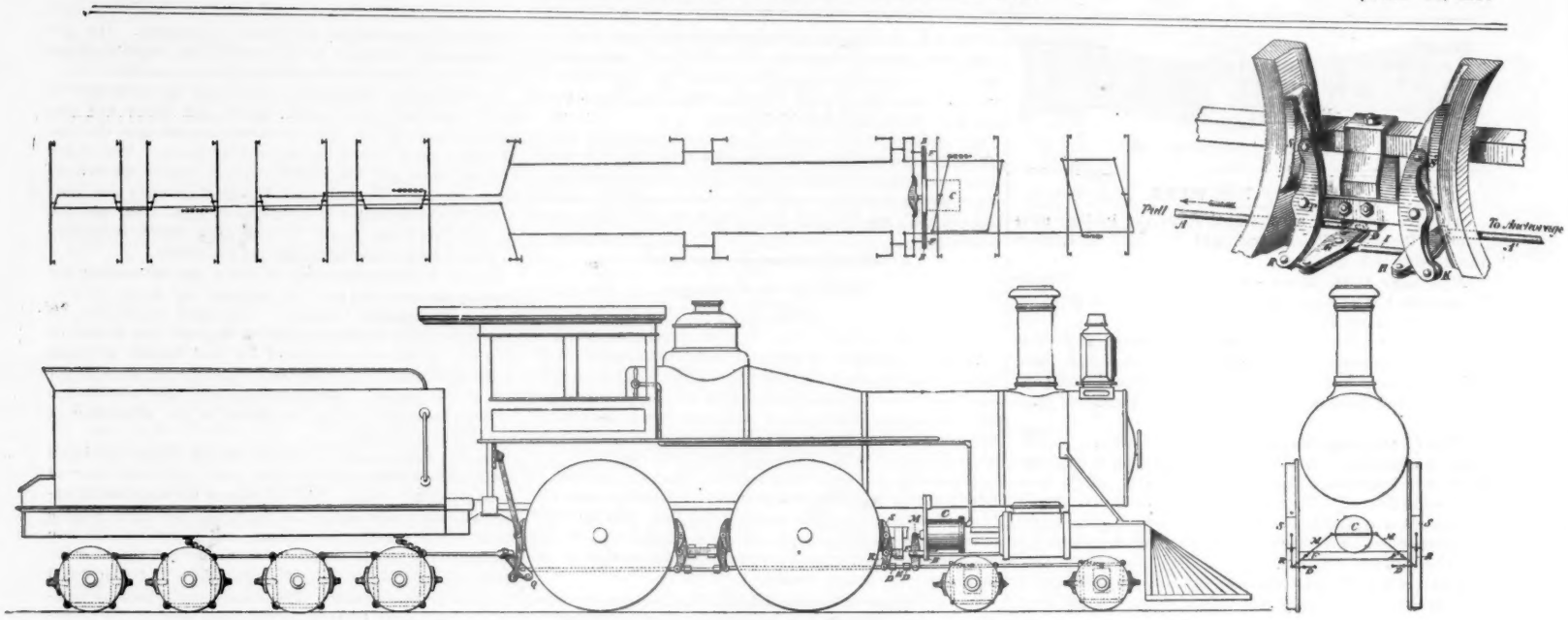
No. of stop.	Speed.	Distance.	Grade.	Shock.
1	20¼	179	Level.	None.
2	38½	586	Level.	None.
3	20	165	53 ft.	None.
4	40	695	53 ft.	None.

With a train of 20 box cars and dynamometer car the stops were:

No. of stop.	Speed.	Distance.	Grade.	Shock.
1	20	111	Level.	None
2	40	421	Level.	None
3	20	127	53 ft.	None
4	40	484	53 ft.	None

No diagrams were taken in the middle car, and the dynamometer car was only used to check up speeds and distances.

In the 50-car train it appears that the distance at the No. 1



THE BEALS STEAM DRIVER AND TENDER BRAKE.

stop was greater at the same speed than at the No. 3 stop, though at the latter point there is a grade. This was because the brakes were not applied until after the post had been passed, and as the amount of the error could hardly be known, it was not considered advisable to change the ground measurement.

A change of leverage was made on the 20 car train, the power being increased, as the leverage used in freight trains is considerably less than in passenger service. This accounts for the gain as compared with the 50-car train. This latter trial was made to test the working of the brakes on a passenger train.

We are informed that gravity runs were made down the 53 ft. grade with very satisfactory performance, the graduation having been very successful. It is said, in fact, that the speed was kept steadily between 13 and 17 miles.

The leverages were reduced so as to entirely avoid skidding, and this fact should be borne in mind in considering the stops made.

The train pipe used was 1¼ in. Mr. G. W. Rhodes and Commissioner Coffin were amongst those who saw the trials.

The Beals Steam Driver and Tender Brake.

The illustrations show the arrangement for a standard freight engine. The motor or brake cylinder, marked *C* in the figure, is placed between the guides, but may be located in any convenient position. It is constructed to use either air or steam. This is accomplished by means of the valve having ports for both, so that the engineer who has an air equipment upon his engine can, by the same valve handle, apply steam in case he should find the air inoperative, thus giving him two chances in cases of emergency. The opening of the valve admits either air or steam, at will, to the cylinder *C*, forcing out the piston rod, which carries upon its outward end an equalizer, which distributes the power equally to two pull lines (one upon either side of the engine) by means of the main levers *M*. Both main levers are fulcrumed at *F* to the bed plate *B*, that carries the brake cylinder and communicate a pull to the floating levers *D*, by means of the fulcrum rod *E*. The pull passes on till it reaches the first shoe in the series, which immediately becomes a fulcrum for the next, and so on, until all are brought to bear, with the same force, upon opposite sides of each wheel. In the transmission of the force from the rear, or terminal shoe, upon the engine to the tender brakes, an oblique lever *Q*, is introduced, with arms so graded as to convey a proper amount of braking force to the tender wheels. In a similar manner, a reduction of force is made for the forward engine truck when necessary. Until the present time, the weight upon the engine truck has not been utilized for the purpose of retardation, fearing that it would produce rigidity, and assist derailment, on application of the brakes. The designers of the Beals brake believe that there is no danger in covering the engine truck with a properly constructed brake.

The working of the brake may be more easily understood by means of the diagram and small engraving, showing sections of two tyres, with brake shoes, rock arms, floating levers and pull rods in position. One of the pull rods *A'*, leads to an anchorage, and the pull rod *A* is actuated by the brake cylinder and main levers, then a pull at *A* moves the inside end of the floating lever *D* in the direction of the arrow, while the other end of the lever is moved in the opposite direction, being fulcrumed at *G*, and at the same time carries with it the lower end of rock arm *R*, which, being fulcrumed at *P*, applies the brake shoe *S* and rock arm *R* becomes rigid, but floating lever *D* continues to move, and now transmits its motion to the next floating lever *H*, by means of the fulcrum rod *I*, but its inner end is held rigid by the anchorage; consequently, the outer end only of *H* can move, and in doing so, carries the lower end of rock arm *K* with it and applies shoe *S'*. The movements thus described are duplicated throughout the whole series upon the engine wheels, and it will be seen that this mechanism can be continued indefinitely, and that it is self-adjusting, as none of the shoes can act until all are in operation, and that each one must necessarily apply the same pressure to the wheel.

The brake is in operation upon the New York, Lake Erie & Western, the Indianapolis, Decatur & Springfield, the Delaware, Lackawanna & Western, and the New York, Ontario & Western R. R. The latter road has adopted it for all its freight engines. The Beals Brake Co.'s address is 229 Broadway, New York.

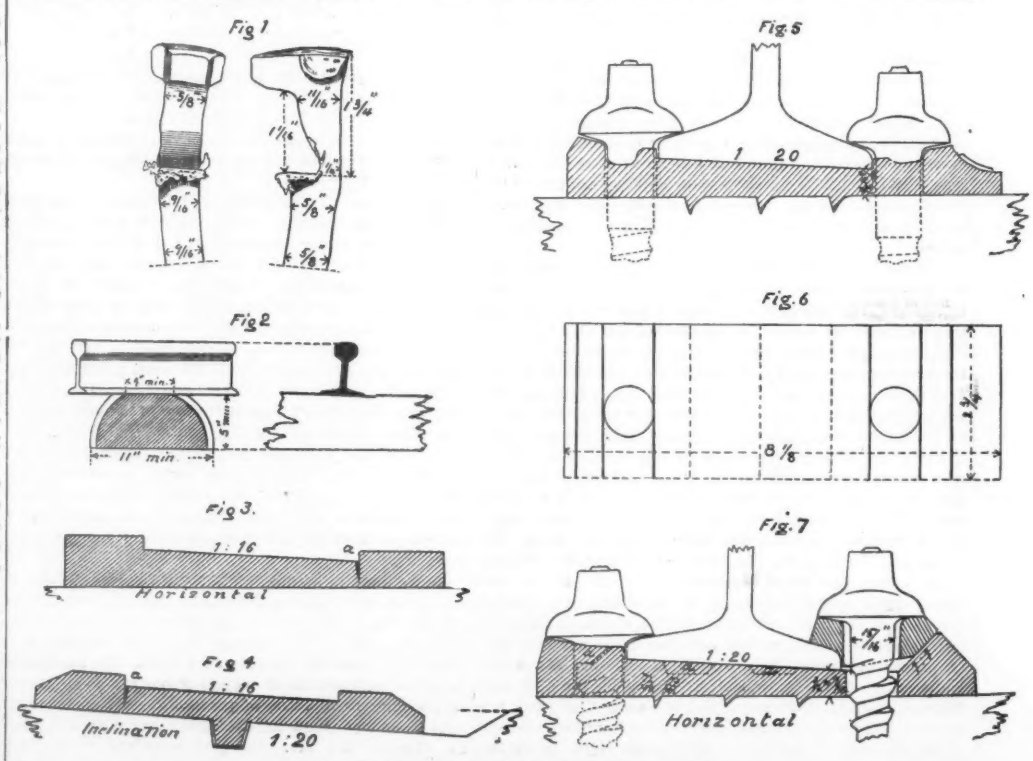
The Post Bearing Plates for Rails.

The great distance between tie centres on European roads, the desire to use wood as economically as possible, and the relief of the spikes from the effects of side wear, as they are shown by fig. 1 of the accompanying cuts, reproduced from *Glaser's Annalen*, led the managers of many of these roads to adopt a bearing plate for the rail. In the case of the Sommering road, connecting Vienna with the southern part of the Austrian Empire and with Italy, where ties of the section shown in fig. 2 had been used, the obvious objections to such ties were overcome by using a rolled plate of the form shown in fig. 3. By this plate the necessary bearing surface was obtained; the necessity of "spotting" the tie to obtain a cant in the rail was avoided, and the side cutting of the rail into the spikes in some measure, though imperfectly, avoided. The imperfection of the latter led the management of the Brenner, when that important road was built, to adopt a bearing plate with a rib below, as shown in fig. 4, involving, of course, a groove cut across the tie. This had, however, the disadvantages of the extra labor required on the ties, of requiring special ties for curves, if the gauge was to be widened on these, and of weakening the tie in its most vulnerable spot, besides giving an opportunity for the starting of decay.

In order to overcome these objections, Mr. J. W. Post, the Engineer of the Dutch State Railways, designed a form of plate with saw-tooth ridges on the lower side, which were caused by the wheel pressure to cut their own grooves into the tie at any desired spot. In order to secure a better fastening for the nail to these plates and to the tie, to which the noisiness of such an arrangement as soon as it became at all loose probably largely prompted, wood screws instead of spikes were adopted, and the form represented in fig. 5 was arrived at. In this form, in view of the greater pressure on the inner side of the rail when inclined, as shown, and also when the rail head is level and the wheel tread coned, the plates were given 2¼ in. projection on the inside of the rail against 1¾ in. outside, and the inner teeth were made to project one-half more than the outer ones, though not so represented on the drawing; the maximum projection of the teeth being a little more than ¼ in. The minimum thickness of the plates was ½ in., and their length in the direction of the rail axis about 5½ in. These plates were made of puddled iron, as piled iron was found liable to the defects shown at *a*, figs. 3 and 4. The groove shown in the upper surface was apparently adopted to lighten the plate, being taken out at a point where the metal was not needed. It facilitated, furthermore, a slight adjustment of the gauge, obtained by screwing down one or the other of the screws slightly in excess. The following results were observed in using these plates: It was necessary to bore the holes for the wood screws to a templet to secure a satisfactory adherence to gauge. [NOTE.—This seems necessary, however, in any use of wood screws.] Knots in the rail bearing are to be avoided. From 100 to 500 trains were necessary to bring the rail base to full bearing.

After 20 months' traffic, the impressions of the teeth remained sharp, and their edges in good order. The gauge and cant of the rail were better maintained than had been generally the case with the same ties without bearing plates, and the rail fastenings showed no wear, deformation nor loosening.

The slight variations in the width of the rail, leading to



THE POST BEARING PLATES FOR RAILS.

more or less side pressure on the screws, have led Mr. Post to modify his design for the next lot of these plates to be laid down to the form shown in fig. 7, and he also proposes to form grooves as shown at *a* in the same figure to reduce the amount of metal required.

It is hardly likely that Mr. Post's bearing plates will find much favor among our managers at present, but as preserved soft wood is introduced, and the necessity for greater economy in wood and larger bearing for the rail is felt. Mr. Post's experiments and the forms thereby attained will form at least a starting point for a scientific form of bearing.

General Passenger and Ticket Agents' Association.

We give below a substantially complete report of the annual meeting of this association, a telegraphic summary of which appeared last week:

REPORT OF COMMITTEE ON UNIFORM STYLES FOR COUPON TICKETS.

A circular letter was prepared, requesting samples of tickets and answers to a series of questions.

In answer to this request for samples of tickets, 141 tickets were received, and answers to the questions as follows:

"Is the sample which you send considered your standard, and is it used exclusively on your road?" Yes, 75; no. 4. "Has its legality been established by a judicial decision?" Yes, 3; no, 43. "If not, what is the opinion of your counsel as to the legality of the conditions which appear in your contract?" Considered legal, or approved, by counsel, 38; doubtful, 10. "If your contract covers special points, which you consider indispensable, please state what they are?" Number showing special points, 16; considered nothing indispensable in their contracts, 7; no special points, 61. "Do you print these tickets in more than one color to indicate class, or other distinctions?" Yes, 54; no, 30. "Can you suggest any insuperable objection to the adoption of standard forms of through tickets?" Yes, 1; no, 84.

The samples received, showing such a variety of conditions and colors, demonstrated the impossibility of adopting any particular ticket as a standard, and the unanimity of opinion that a uniform standard should be adopted determined your Committee to arrange a new contract, combining to the fullest extent the essentials of all, and at the July and September meetings the contracts attached hereto were adopted.

Form A. Regular Ticket.

To CHICAGO & NEW YORK R'Y CO., Local.
Via C&NY.

DESTINATION.

FORM 000 C.&N.Y.R'yCO.

Agent's Stub.—To be detached when ticket is sold.

9-12-87

Through Rate, $.....

INSTRUCTIONS TO AGENTS.

Fill in Destination (and State) **plainly with ink** in the right-hand margin of Stub and Coupon attached to contract.

If sold as Second Class, indicate same **plainly** on Stub, Contract and each Coupon.

If Limited, cancel with an **"L"** punch the date of expiration in the Contract, also the * in each Coupon and Stub.

When Passenger's and witness' signatures are required they must be written with ink.

Return this Stub with your monthly report.

YEAR	1887	88	89	90
99	98	97	96	95	9-	93	92	91

CHIC. & NEW YORK R'Y CO.

Good for One Passage
To the POINT and
OF THE CLASS DESIGNATED

When officially Dated, Stamped and presented with Coupons attached.

SUBJECT TO THE FOLLOWING CONTRACT:

1st. In selling this Ticket and Checking Baggage hereon this Company acts as Agent and is not responsible beyond its own line.

2d. It is subject to the **stop-over** regulations of the lines over which it reads.

3d It is **void** for passage if any alterations or erasures are made hereon, or if more than one date is canceled

4th. If the Coupons are punched or marked SECOND CLASS, the passenger is entitled to **Second Class** passage only, otherwise **First Class.**

5th. If limited as to time it will not be accepted for passage unless used to destination before midnight of the date canceled by **"L"** punch in margin hereof, and is subject to exchange either in whole or part, at any point on the route for a continuous passage Ticket or Check.

6th. Baggage liability of any company is limited to wearing apparel, not exceeding $100 in value.

☞ **No Agent or Employe has power to modify this Contract in any particular.**

A. B. C.

General Passenger Agent.

CHICAGO & NEW YORK RAILWAY.

BLANK
TO
Station Stamped or Written * in Margin of this Coupon.

000 | FIRST CLASS. This check not good if detached.

Via C&NY.

D	A	W	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Jan	Feb	Mar	Apl	May	Jun	Jul	Aug	Sep	Oc	Nov	Dec	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

DESTINATION.

The signature feature is not considered necessary in the larger portion of the country, and a separate form is proposed for use where needed, having the following additional clauses, viz.:

7th. When the ticket is signed below by the purchaser, or if time limited, it is **not transferable,** and if presented by any other person than the original holder, it will be taken up and full fare collected.

8th. The holder will identify himself as the original purchaser of this Ticket by writing his name, or by other means if necessary, when required by Conductors or Agents.

These, with space for signature, make the contract about 1⅞ in. longer than the form shown.

As the importance of having the contract printed as legible and distinct as possible is generally recognized, it is recommended that plain large type be insisted upon, and of which the compactness of the contract will admit. It is also recommended that the contract be printed across the ticket horizontally, and of the size of the form submitted.

We recommend, in the event of the adoption of a standard ticket, that a suitable design be adopted, and suggest that the matter be referred to a committee with power to select and adopt such heading and arrange the same in connection with the contract, showing size of ticket, type, etc.; the contract thus arranged to be printed with the proceedings of this meeting as the authorized standard coupon ticket of this association. We recommend that the reduction in class or from whole to half be made by perforation, punching, or by stamping with indelible ink. We also recommend the adoption of the paper known as "enameled safety paper," which, on account of the peculiarity of its surface, renders changes or erasures impossible without being easily detected. We also recommend the following colors, viz.:

First class one way, face, light green; back, orange.
Second class one way, face, canary yellow; back, orange.
Third class one way, face, dark salmon; back, orange.
Round trip, face, stone gray; back, orange.

D. J. FLANDERS,
HENRY MONETT,
O. W. RUGGLES,
JAS. L. TAYLOR,
W. A. THRALL,
} Committee.

The report was fully discussed but no amendments were passed.

The Chair appointed Messrs. Flanders, Monett, Ruggles, J. L. Taylor and Thrall a committee as recommended in the report of the Coupon Ticket Committee, with instructions to report at the spring meeting. A resolution was adopted to the effect that a uniform style of contract for round trip tourists' tickets should be adopted. This was referred to the special committee on one way tickets.

The following resolutions of the National Association of General Baggage Agents at their Denver meeting, July 20, were discussed and formally approved:

All through excess baggage collections will be prorated on the mileage basis, same as coupon ticket sales.

All through excess baggage collections will be reported in detail by excess receipts, tags or checks, numbered consecutively, showing stations from and to, route, weight, rate and amount, on the same principal that through or coupon ticket sales are reported to connections and intermediate lines.

When excess baggage charges are collected on baggage checked to or via any connecting line, the agent of the initial road will attach a card to the strap check of one of the pieces, showing where from, where to, excess weight, amount collected and the number of the excess baggage receipt, tag or check issued in connection.

In resolving in favor of issuing rate sheets quarterly a proviso was inserted that monthly supplements (for new roads) could be issued. It was

Resolved, That we recommend that the proper officers of the Trunk Line Passenger Association, Southern Passenger Association, Central Traffic Association and Western States Passenger Association be requested to prepare a special rate sheet showing rates *from* all prominent points in the territory of their respective associations *to* prominent winter resorts to which round trip excursion tickets are usually sold.

Resolved, That when the special tourist rate sheets above referred to are published no round trip winter tourist tickets shall be sold to points not named in said sheets.

It was also

Resolved, That the compilers of all rate sheets be instructed to furnish, without charge, to the Ticket Auditors one copy of their rate sheet each month.

The members from east and south of Chicago were taken by special train from Chicago over the Chicago, Burlington & Quincy, and the Chicago, Burlington & Northern, and were returned by the St. Paul & Duluth, Northern Pacific and Wisconsin Central via Duluth and Ashland, the trip including a stop of half a day at Duluth and one of two days at Hotel Chequamegon, Ashland, the party being sumptuously entertained by the five roads above named during the whole trip. The souvenir invitations issued by the passenger departments of the roads that entertained the party from Chicago to St. Paul, Duluth, Ashland and back to Chicago were a marvel of beauty. An 8 by 10 book of a dozen or more pages opens with a frontispiece showing finely executed portraits of the President, Vice-President and Secretary of the association; different pages have artistically colored and embossed bills of fare for the various dining car meals of the journey, interspersed with *good* views of the scenery along the route, both town and country. The cover, which may have been made from paper furnished by the freight claim department, is embellished with an ivory tablet attached by silk cords and bearing a steel engraving of an iron horse which looks natural, a remark that to many views of the kind would not apply. The book is fastened with ribbons of such gorgeous hue that they, no doubt, influenced some of the votes on the standard colors for tickets, and the ribbons are held in place by four gay red seals bearing the imprint of the respective roads. The *finis* is in the shape of a silk leaf bearing an engraving of one of the prepossessing young ladies of the Northwest, who says

"Farewell! a word that must be and hath been,
A sound which makes us linger; yet—farewell!"

with such a bewitching expression that the G. P. A.'s must have wept at parting. The souvenirs are the work of Mr. S. C. Patterson, of 177 Broadway, New York, who is a professional, and wonderfully successful, designer of novelties, both for souvenir and advertising purposes. He has shown remarkable ingenuity, skill and wit in supplying novel ideas as well as in executing them.

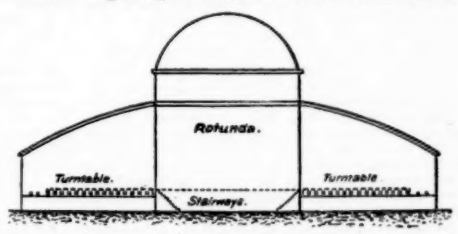
Handling Passenger Traffic at Crowded Terminals.

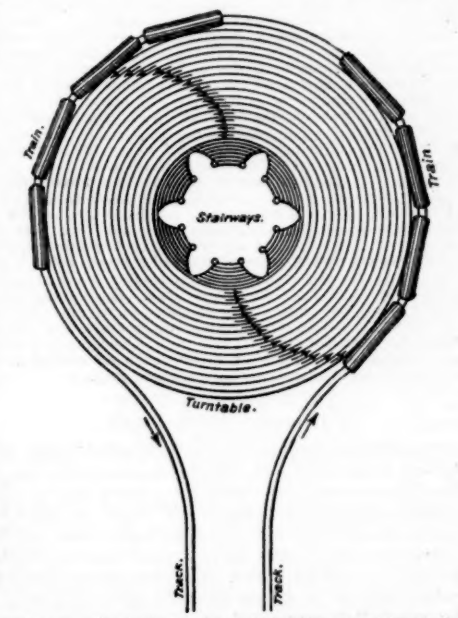
The accompanying sketch and description of a unique device for loading and unloading passenger cars at terminals are sent to us by the inventor, Mr. G. W. Pearsons, of Kansas City, Mo. He writes that it was the result of his personal study of the Brooklyn Bridge termini during the evening crowd, and may be best illustrated by noting the peculiarities and capabilities of that structure; the carrying capacity of which is of exceptional importance.

The device is intended for use in connection with a loop in the track at each terminus of the bridge. It consists of a turntable made of annular rings, having a common floor level and differential motions.

The centre of the rotunda occupied by the turn-table is used for staircases to the story below. These are, of course, stationary.

The movement of the annular rings is shown by the arrows. The movement of trains on the bridge is assumed at perhaps 10 miles per hour. As they approach the turn-table the grade rises so as, to slow the trains to 4 or 5 miles per hour. The turn-table is driven by separate power to avoid the inequality of motion in the main cable, takes hold of the cars as they come beside it, either by separate cable connection or such other device as may be best suited to enable the cars to travel with the outer edge of the turn-table, which has such a motion as will give time for loading and unloading. This will be most expeditiously done by side entrance, the side of the car below the window dropping on to the turn-table and forming a landing platform. The capabilities of the annular rings to reduce or accelerate motions are much greater than would be generally supposed. With a variation of about 2 in. per second, at adjoining edges of the annular rings, the motion of the outer ring which, traveling with the cars, makes a revolution in, say, three minutes, may be reduced at the ring next the stairways to about one revolution in 24 hours. The adjoining edges would be covered with a light shield, sunk into the floor, to prevent canes, etc., from getting stuck in the space between them. One of the first questions to be settled is how much motion can be permitted in the time of an ordinary step, for any number of annular rings may be used and the increment made as





small as may be desired. As sketched it is about two inches, seemingly small enough to satisfy the requirements of any "old woman of either sex."

Returning to the train: As it leaves the turn-table the same rise that furnished the up grade gives a corresponding down grade to bring the motion of the train again up to that of the main cable, so that no shocks can occur and theoretically no collisions, *each train having, when in the same position, the same motion*, and, no stoppages occurring, the device is believed by the patentee to be able to raise the capacity of the bridge to 1,000 passengers per minute.

Such are Mr. Pearsons' explanations of his device and claims for it. The objections that will at once occur are the room taken up, the mechanical difficulty of maintaining the differential motions of the numerous rings, the practical objections to curved platforms, and the theoretical if no actual objection to *moving* floors for the passage of hurrying and promiscuous crowds; but the idea is ingenious and worth consideration.

A Good Accident Report.

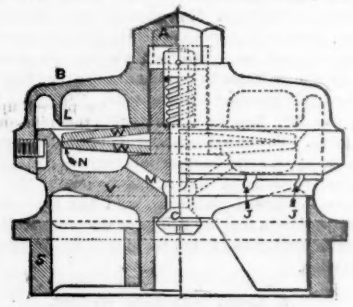
On the 7th of September there was a collision at Afton, Ia., on the Chicago, Burlington & Quincy, in which two passengers were killed and 12 injured. A west-bound passenger train stopped by a freight ahead of it was run into by a following fast mail train. The order of the stations westward from Murray, is: Thayer, 6 miles; Afton, 14; Creston, 23. The following account of the collision is from the Council Bluffs *Nonpariel*. While not expressing full agreement with all the views of that paper we print the report as a sample of what newspapers ought to do in placing matters of this kind before the public. When such careful statements as this are published about all serious accidents, the proper methods of prevention will be much nearer solution than they now are. When we have an investigating body like the English Board of Trade, the reporter of the *Nonpariel* will not be the most

unpromising candidate for an inspectorship under it. The account says:

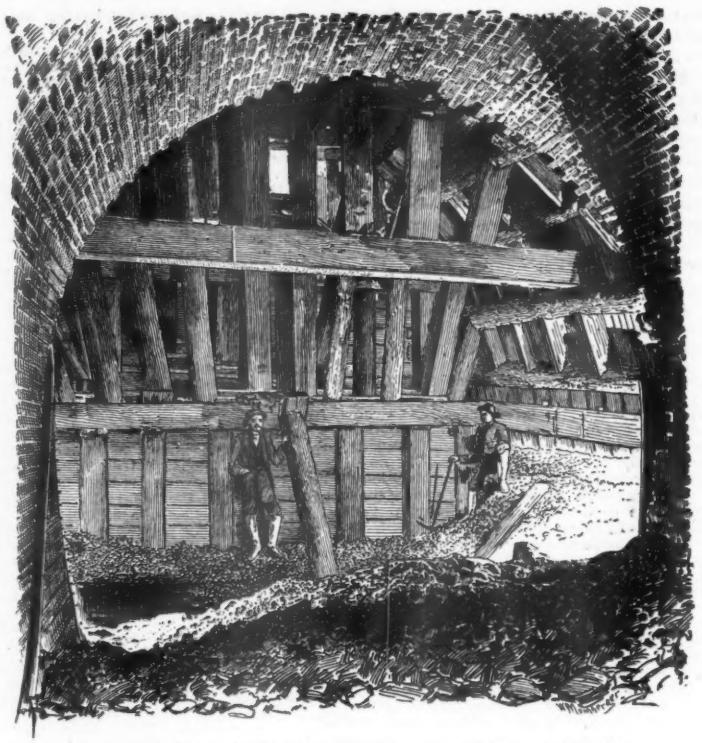
The Railroad Commissioners have been investigating the matter, and from the testimony given before that tribunal it would appear that there was a series of mistakes, and that tho blame does not rest entirely upon any one individual, and that while the elimination of any one of the mistakes would have prevented the collision, the combination of unfortunate errors was multiplied in so complete a manner that no one of the leading characters in the tragedy can say "you did it." In the first place the train dispatcher has not explained why he ordered the conductor of the passenger train, No. 3, to look out for the freight train running in sections in advance at Thayer, the station east of Afton, and did not give a similar order to the fast mail, No. 7, that was only 20 minutes behind. In the next place, the single torpedo that was st uck by No. 7 at the whistling post, just east of Thayer, under the rules of the company would require the train to come to a dead stop and not proceed until the cause for the placing of the torpedo on the track was explained. The train did not stop, but slacked up and stopped at Thayer, and pulled out without any inquiry as to what the torpedo was for. Again, when the same train struck the second torpedo west of Thayer, and stopped and took up the uniformed flagman, who had dropped off from No. 3, the rules require that the flagged train should not proceed until the reason for the flag had been made known to the engineer. The fast mail, or No. 7, started ahead from a signal from the flagman given from the rear [the train having apparently run past him before it stopped], and that, too, from a flagman from another train. The engineer and the flagman disagree as to the signal given, the flagman insisting that he gave the sign with both hands to go ahead slowly, while the engineer insists that the signal was given with the flag, and was simply to go ahead. It was the duty of the flagman to report to the engineer the reason for flagging the train. This he did not do, but remained in the mail car in conversation with the mail agent and conductor until the collision. It was clearly the duty of the conductor of No. 7, though not made so by the rules, to ascertain why the train was flagged, and to also see that the information was imparted to the engineer that he might run the train in accordance therewith. The conductor of No. 7 claims in his testimony that the flagman entered his car and that after passing the time of day he had just commenced to ask him why he flagged the train when the crash came, and that the way was clear for the flagman to have gone forward through the train to communicate directly with the engineer. When the flagman was dropped off from No. 3 to go back and flag No. 7, No. 3 was running about fifteen miles an hour and the conductor had told him that there was danger of freights being delayed in getting up the hill just east of Afton. When the freights stalled on Afton hill and No. 3 was forced to come to a dead standstill, the conditions had entirely changed from what they were when the flagman dropped off, and even though the flagman had done his entire duty in the premises the information that he was expected to impart to No. 7 was not the condition of the trains at that time, and the conductor of No. 3, knowing that the track was entirely blocked ahead of him and that he was just on the time of No. 7, should have sent another flag back, even though not required by the rules so to do. The distance from the point where the engineer of No. 7 could have seen the rear of No. 3 around the curve was 820 ft. His train was going at about twenty-five or thirty miles an hour, and struck the up grade at the foot of Afton hill. The engineer could not have applied the air brakes and reversed his engine in much less time than five seconds, and by that time, at the speed he was going, quite a portion of the 820 ft. was used up, and his train being a light one did not respond to the brakes as readily as a heavier and longer one would have done on a curve. The coroner's jury attached all the blame upon the flagman of No. 3 and the conductor of No. 7, and directed information filed against them for manslaughter. They were accordingly arrested and placed under bonds of $1,500 each to answer to the charge of manslaughter before the grand jury.

Improved Safety Valve.

The following description of a recently devised safety valve is taken from *Industries*. It is the invention of M. Barçon: *S* is the valve seating, and *V* the valve, which has a central vertical channel and side channels *M*. When the valve is in proper condition steam is wholly prevented from entering the central channel, there being a small auxiliary valve *C* held up by a spring as shown. The lever presses not on the valve itself, but on a loose cover *B* with hexagon head *A*, by which both cover and valve can be turned round to grind the valve on its seat. The pressure exerted by the lever on the hexagon head is transmitted to the valve by means of two conical steel washers *W W*, which nearly fill a recess in the valve, leaving only a very narrow annular groove *N* left free. The spring



washers are so adjusted that they will just balance the steam pressure, but if the latter should increase while the cover is prevented from rising by the lever being wedged up or the weight on this lever being unduly increased, the spring washers will yield and allow the valve to rise. At the same time the rod of the auxiliary valve *C* comes in contact with the upper end of the cylindrical recess in the cover, and thus this auxiliary valve is opened, admitting steam through the small ports *M* into the central recess of the main valve. This steam passing through the narrow annular slot *N* strikes a circular lip *L* on the inside of the cover, and escapes by the openings *J*. In this manner the lip acts as a powerful steam whistle, producing an audible signal which shows that the valve has been tampered with. From this description it will be seen that as long as the lever is properly weighted and free to rise, this valve acts acts like any other ordinary safety valve; but should the lever be overweighted or wedged up, the spring washers become compressed, and allow the valve to rise as soon as the normal pressure is exceeded. The fact that in this case the steam whistle comes at once into action, and gives to the works manager or foreman timely warning that there is something wrong with the safety valve, will naturally prevent the driver from tampering with or over loading the valve.



NEW CROTON AQUEDUCT, SHAFT 17, SOUTH HEADING.

Croton Aqueduct, Shaft 17, South Heading

The engraving herewith presented was made from a photograph of the south heading of shaft 17 (on the new Croton Aqueduct), taken twenty four hours before the accident, which was described in our issue of week before last. The drift, which extends forward from the top of the section, was, when the photograph was taken, illuminated by an electric light. The section had been completely timbered, and had been all cleaned out ready for the masons, who were coming in at the next shift, when the break occurred. Our drawing, therefore, is an absolutely correct representation of the work at the time of the accident, with the single exception of the bank of dirt at the end of the completed masonry which, of course, had been entirely removed. Since our last report no further light has been thrown upon the cause of the cave-in. The suddenness of the falling of the sides and face of the heading led to the belief that the disaster was caused by the dropping of a mass of earth upon the top of the section, which was covered to a depth unknown. The force of the blow was then transmitted to the sides and bench, which, being the weakest parts in the structure, gave way and allowed the forward ends of the crown bars to drop as we have already described. If this explanation be correct, it means that there was a pocket or air chamber somewhere between the roof of the section and the surface of the ground, and that a portion of the roof of this chamber fell. Whether this reasoning be correct or not, it is certain that there is now an air chamber between the section and the ground surface, since in the latter there is no hole or indication of any settlement having taken place. This being the case it is certainly probable that the roof of this chamber is liable at any moment to drop unless, which is possible but not probable, it is formed by the arching of rock. That the accident was not due to the gradual increasing of the load caused by settlement appears to be shown by what we might term the unanimity with which the parts caved in. There was no warning whatever. Judging from appearances a blow was delivered upon the top and the force of this blow was transmitted to the sides and bench, which yielded instantly to the pressure.

The same method of timbering will be used when work is resumed. We suppose that before any further attempt is made to pass the ground, the exact nature of the material overhead will be ascertained.

Charles Francis Adams on Railroad Employes.

President C. F. Adams, of the Union Pacific, in his letter to the Locomotive Brotherhood's meeting at Boston last week, said:

I think it very clear that, as compared with 20 or 25 years ago, a much greater interval exists between the leading officers and the mass of employés of railroad corporations. This could not otherwise than be so. Twenty years ago the largest railroad corporation in the country was small compared with many of those which now exist. It is one thing to handle a railroad of 50 or 100 miles in length, employing a few hundred men, nearly every individual of whom is personally known to the highest officers of the company, and it is a wholly different thing to manage the affairs of a company operating, perhaps, 5,000 or 6,000 miles of track and employing 15,000 or 20,000 men, but a small percentage of whom can ever come in personal contact with any leading official. To this growth, and the lack of personal contact and acquaintance entailed by it, I attribute in no small degree the jealousies which have of late existed, and the labor organizations which have grown out of them. They are a natural outcome.

The difficulty is that the growth of our railroads has outstripped the organizing capacity of those who have had them in charge. We have gone on with the system of labor adapted to small corporations until we have wholly outgrown them, and something else has been forced to take their place. This something else has not shown the work of either an organizing or a kindly hand. As a rule, it has been a makeshift based on the operation of the harsh law of supply and demand. It has seemed to me that, in connection with our large companies, at least, a regular service should ere this have been devised; a service in which its rights and duties, position and permanence would all have been fully regarded and carefully provided for.

My theoretical idea of the permanent service of a great railroad corporation would be as of one in which men would only be received after passing through a period of temporary probation. When, however, they did at last enter regularly into the permanent service of the company they would be entitled not only to regular promotion and to stated increase of pay as the period of service increased, but also to a stipulated provision in case of disability or retirement from age. Moreover, they would be protected against summary dismissal except for cause; and on the other hand, the company should have security against strikes or combinations. The rights of each party should be recognized, established in advance and carefully observed.

I have never seen any good reason why some system such as this should not, as the result of a sufficient number of experiments and failures, be developed in time to a high degree of perfection. Since I have been personally connected with the management of a company, other, and much less attractive, matters have engrossed my attention, and to this I have been able to give neither the time nor the thought it deserved. That I have been unable to do so has been a source of much regret to me.

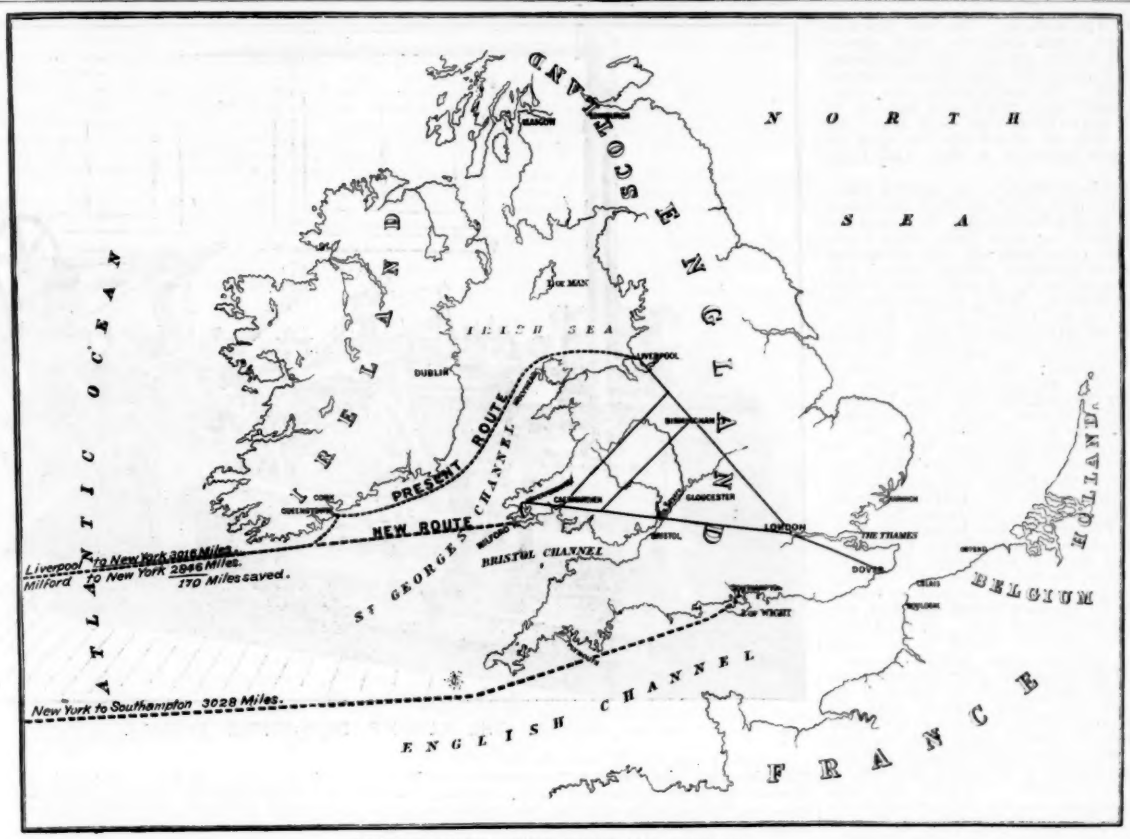
The International Railroad Congress.

The second session of the International Railroad Congress is now in progress at Milan. In view of the extent and importance of this body, it is well to present some of the points of their scheme of organization which is presented for consideration at this session.

It is stated first that the object of the Congress is to promote the progress of railroads. It is to be composed of governments as well as companies owning or working railroads. For executive purposes the Congress is represented by an International Commission, the headquarters of which are at Brussels, and the members serve without pay. The duties of this Commission are to designate questions for discussion, to prepare studies of these questions, to secure the publication of the proceedings of the Congress and of papers and discussions and to administer the finances of the Congress. This Commission is composed of a president, five vice-presidents, one secretary and twenty-two other members, and the members are chosen so far as possible from different nationalities and companies, and in no case shall more than nine members be of the same nationality.

The executive committee of this Commission is to hold quarterly sessions and can be called by the President or various members for extra sessions. The Congress is to sit every two years. Those who have a right to sit in the Congress are members of the International Commission, delegates designated by members of the Congress, and the secretaries and treasurer of the organization. The governments are empowered to fix the number of delegates whom they will send, but railroad companies can be represented by delegates only in proportion to the extent of the systems which they control.

At each session the Congress is to be divided into various special sections to consider the subjects, for example, of permanent way and works, of rolling stock and material, of operation, of general administration, etc. The discussions



ROUTES FROM NEW YORK TO LONDON.

will be held in French or in the language of the country where the Congress sits, and the records will be kept in French. The expenses are to be paid by assessments, and by such special subsidies or other aid as may be received. The assessments for governments will be fixed by the governments themselves. Railroad companies will pay 100 francs minimum and an extra sum proportional to the extent of their sysems.

The provisional list of delegates to the second session includes representatives from the governments of the Argentine Republic, Austria-Hungary, Belgium, Brazil, Bulgaria, Denmark, France, Great Britain and India, Holland, Italy, Mexico, Portugal, Roumania, Servia, Sweden and Norway, and Turkey. Those nations which have state railroads also send delegates to represent them, and there are some 120 private corporations represented. The only representative from the United States announced in this list is Mr. T. N. Ely, of the Pennsylvania.

The Milford Haven Route to England.

The recent great improvements in the speed and comfort of the large mail steamers running across the Atlantic are largely neutralized by the fact that both New York and Liverpool have bars at the entrance to these harbors. A long delay is often necessary before there is sufficient depth of water for a large steamer to cross.

On this side of the water, it has been proposed to utilize Sag Harbor on Long Island and let fast steamers start from there instead of from New York. This plan would entail a railroad journey along the whole length of Long Island, and in that respect would not be as convenient as the present plan of starting from the wharves in the North River close to the principal hotels and the residence portion of the city.

At the English end the case is different. Assuming that London is the objective point, a railroad journey of 200 miles is necessary before it can be reached from Liverpool and 78 miles from Southampton, and it would be impossible to altogether abolish such a journey and bring the ships within a drive of the heart of the metropolis, as here. The Milford Haven route would, however, as has been previously pointed out in these pages, effect a considerable improvement on the present routes via Liverpool or Southampton.

The three routes from New York to London may be compared by the following table, which is based on the assumption that ships and trains of equal speed are employed, the ships running on an average 18 knots per hour, or nearly 21 miles, and the trains 40 miles per hour including stoppages. Both are fair averages of what is attained with existing fast steamers and trains. At present, however, the steamers on the Liverpool are somewhat faster than those on the Southampton route.

DISTANCE.	Queenstown and Liverpool.	Milford Haven.	Southampton.
Sea voyage, nautical miles	3,048	2,878	3,028
Railroad journey, statue miles	192	265	78
TIME	D. H.	D. H.	D. H.
Sea voyage	7 1	6 16	7 0
Detention at Queenstown	2	...	....
Detention at bar	5	....	3
Landing, customs, etc	3	1½	1½
Railway journey	5	6½	2
Total, New York to London	7 16	7 0	7 6½

The length of the voyage across the Atlantic varies about 100 miles, according to the course, vessels often taking the longer southerly course in order to avoid fogs and icebergs

America and England can virtually be brought 24 hours nearer to each other by using the port of Milford Haven, which, by the shortest course, is only 2,846 miles from New York, or 170 miles nearer than Liverpool.

Passengers arriving at Queenstown from America by the Liverpool route are detained while the mails are landed, have then to encounter the dangers of the St. Georges Channel, and reach the entrance to the Mersey often only to find that there is not sufficient depth of water at the bar to allow the vessel to pass. That difficulty overcome, they have next to embark on a steam tug and are conveyed to the landing stage at Liverpool, whence a cab has to be taken to the railway station and the journey of 5 or 6 hours to London follows. Altogether a day and a half may be occupied from Queenstown to London.

By the Milford route the vessel will run direct from New York to Milford and arrive alongside the quay or pier on which the train will be waiting to convey mails and passengers by special service via the Severn Tunnel in about six hours to London, and the time occupied in the journey between America and London will be reduced by about 24 hours. The saving of time by the adoption of the Milford route will be of the greatest importance, not only with regard to passengers and mails, but also in connection with the increasing import trade in cattle, dead meat and provisions

Milford Haven ranks with San Francisco, Rio Janeiro, Sydney (New South Wales), Queenstown, etc., as one of the finest harbors in the world, spacious, sheltered and deep, with no bar and an easy entrance free from dangerous shoals or rocks. The Great Western Railway (England) already runs its trains on to a deep water pier, but in addition new wet docks have been built to accommodate a large trade. These docks will have 34 ft. depth of water over the sills at high water, spring tides, and will therefore be able to accommodate the largest ships afloat. The graving dock nearly completed is 550 ft. long by 74 ft. wide, or sufficient to accommodate any vessel except the Great Eastern, which is 693 ft. by 116 ft. over all.

The accompanying illustration shows clearly how the saving in distance is effected. The lines from Liverpool and Milford to London are drawn as bee lines. The actual distances by the shortest existing railroad routes to London, 192 and 265 miles, are about 73 miles in favor of Liverpool, but this is more than offset by the greater saving in sea voyage, detention at the bar and inconvenience of landing at Liverpool. Under the present arrangement a passenger leaving New York on Saturday morning reaches Queenstown early the following Saturday morning, lands in Liverpool on Sunday morning, and arrives in London that afternoon. The same steamer by the Milford Haven would land him at Milford about noon on Saturday, and he could reach London in time for dinner.

The mails would of course be correspondingly accelerated 24 hours. As travel between England and this country is yearly increasing, and would be far greater but for the loss of time involved, the advantage of speedier communication is obvious.

History of Railroads Between Cleveland and Chicago.*

During the political excitement of "Tippecanoe and Tyler too"—of log cabins and hard cider—forty-seven years ago, when few of the members of this club were out of their swaddling clothes, or in them for that matter, the old fossil who attempts to address you to-night commenced railroad engineering on what is now known as the Lake Shore & Michigan Southern Railroad.

The ignorance of the "principles and practice" of railroads was in those days profound. There were almost no precedents, and experts were quite as scarce as dollars, which is saying a good deal.

New York had started to build a road—the New York & Erie—from New York to Lake Erie, and a class of men which would be called to-day a syndicate "log rolled" the Ohio Legislature until they procured the passage of what was called the "plunder law." This law provided that when certain companies named should have expended a certain sum of money in the construction of their road, the state would loan them a like amount of state bonds.

One of these companies was the "Ohio Railroad Company," chartered to construct a railroad from the state line on the east along the lake to the Maumee River, at Manhattan, below Toledo. The subscribers to this company transferred their farms, town lots and other property (money they had none) to the company in payment of stock. Upon this property money was raised and work in earnest was begun. Finally estimates were fixed up so that the company drew some $250,000 in state bonds. The company had banking privileges, and "Ohio Railroad bills" were as plenty as Canada soldiers in June. Then went up the cry of "plunder," and the Legislature repealed the law, and up went the company, the engineers were paid off in old pile drivers, and the road slept the sleep of the just for ten years. The wise ones said this was to be expected, for it was "an insult to the Almighty to build a railroad along Lake Erie."

I will give a brief description of the mode of construction in those primitive days. The road was laid through a heavily wooded country. West of Sandusky some 50 miles was through an almost unbroken forest plain of heavy timber. Timber was of little worth; so the grade was made of timber, that is, the road was built upon piles, even through the few shallow cuttings. The gauge was 6 ft. and the piles were driven 5 ft. apart longitudinally. The drivers were double, with two hammers and two pairs of leaders. The rails were fastened to the bottom of the sills to run on iron rollers placed on top of the piles. A circular saw was hung on a sway bar between the leaders at grade. The piles were delivered along the line on either hand with the butts toward the machine. By means of friction winches and long ropes passing over the head of the leaders they were snatched up and brought to their places with great promptness and precision. When the piles were driven the saw was brought to grade in this wise: The engineers had provided a set of two grade pegs every 50 ft. On two sets of these were placed straight-edges with another on the saw. By means of screws the sway bar was raised or lowered to bring the top of these straight-edges into the same plane. Then the saw was set in motion and swung right and left, cutting off the piles to grade. Then the wheels or rollers were placed upon them; a drag rope on each side was hooked to the pile and carried through a sheave at the rear and brought forward to the winch.

The engineers had also provided centre stakes ahead and a vertical line in the head of the machine. By means of the two drag ropes, the great machine was easily kept to line. Next followed the tie fitters. The ties, generally of white oak, were made in sectors, split from trees some 2 ft. in diameter and must have a dressed face on the bark side of 8 in.; this tie was fitted to the top of the pile, its centre being brought to line. The engineer then pricked off the grade on every fourth tie so as to leave about 4 in. neck above the top of the pile; wedge shaped gains were then sawed to receive the wooden rails, about 9 in. wide. These gains were nicely adzed out to grade with the help of 16 ft. straight-edges; next a 2-in. auger hole was bored through the tie and 12 in. into the pile; then 4 in. of salt was poured into the hole and a red cedar pin was driven hard upon it. Perhaps the reason why these piles, many of them, after forty years' exposure, are still standing, is that this salt has not wholly lost its savor. The piles had to be not less than 10 in. in diameter at the small end. Some of them were split piles, 4 being made from one cut; this was permitted only where the grade was low. And now the saw-mill gets in its work. These mills were models of simplicity and efficiency. The cylinder was inverted over the saw, with the piston attached direct to the muley saw. The rails were 8 by 9, and I have known as many as 20 of these rails to be made from one cut. These were sized and

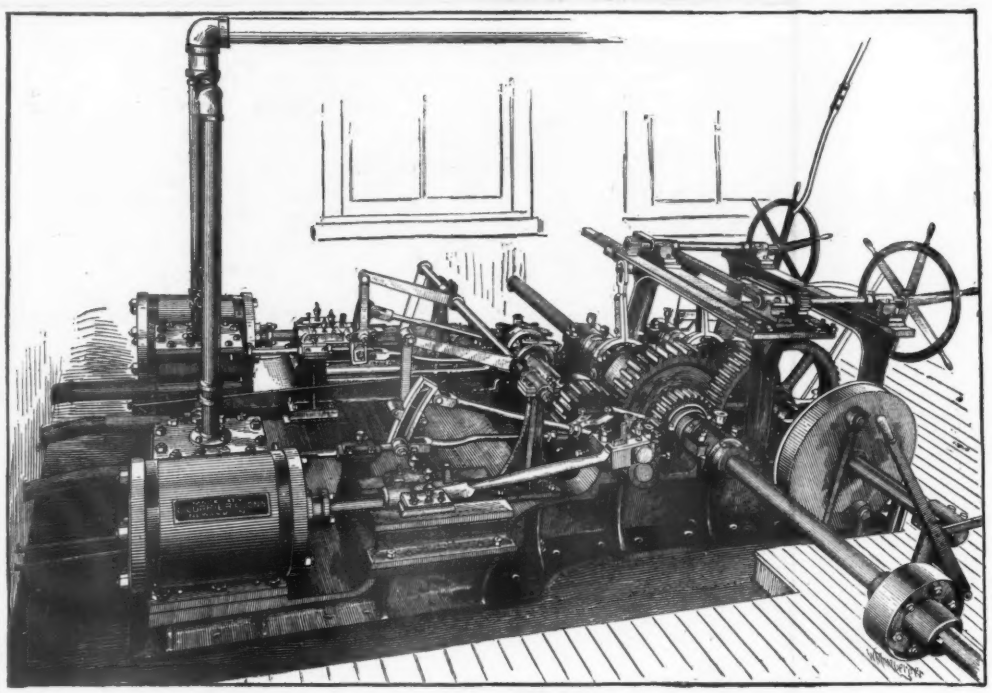
*A paper read by J. H. Sargent, before the Civil Engineers' Club of Cleveland.—From the *Journal of the Association of Engineering Societies.*

keyed into the gains, the 9 in. vertical. The saw logs were gathered in at convenient points along the track; always enough to make rails sufficient to reach to the next station ahead. The mill being on wheels was then hauled forward to the next station by oxen. The design was to place maple ribbons on top of these rails, upon which iron bars, ⅛ in. thick, were to be spiked, and to fill in with earth before this superstructure decayed. This was afterwards done upon the Sandusky & Mansfield, now Baltimore & Ohio, Lake Division.

This was largely a Cleveland project. Its general offices and bank were here as well as some of its chief promoters. The seed then sown fell upon a barren soil. It lacked coin as a fertilizer. Here it rested for some years, while Cleveland was content with her canal boats and lake navigation. Meantime the little town of Sandusky, without state or government aid, was pushing out one line of rails toward Cincinnati and another toward Newark. While engaged upon this last work, at the request of the Cleveland *Plain Dealer*, I prepared sketch maps of the state, showing what was being done by Sandusky, and that Cleveland might push out toward Columbus and Cincinnati, with estimates of business so very small that I should be ashamed to repeat them today, but far too large for the credulity of the age. The seed, however, was sprouting, and men, whose enterprise was backed by their dollars, began to open their eyes. The C., C., C. & I. Co. was organized, and Cyrus Williams and his assistant were placed in the field, and the whole country between Millersburgh on the east and Marion on the west was scoured, and a pamphlet report, with profiles, maps and estimates was made. This took the eye of some New York and Massachusetts men of enterprise, and brought Harback, Stone and Witt to the front and introduced them to the magnificent fortunes awaiting them at Cleveland. There were two parties in the company, one led by the late Governor Alfred Kelly, who desired to carry the road over the hills on the east, and the other by Harback, Stone and Witt, who wished to turn them—the hills—on the west. L. W. Ashley, an imported engineer, was placed in charge of the eastern route, and a native engineer—your humble servant—was called home from Lake Superior, after the snow began to fly in the fall of 1847, and placed in charge of the western route. I took the level myself, with the late General Devereaux as rodman. Suffice it to say that the Westerns "got there," and by July, 1849, the rails reached Wellington. When the consummation of this project was assured, the active spirit of Frederick Harback, far too active for the body that supported it, sought other fields to conquer. I have introduced into this paper much of the C., C., C. & I. road as an introduction or stepping stone to the great ultimatum, the Lake Shore & Michigan Southern, to which I will now return.

Mr. Harback formed a combination by which the lazy, sleeping Buffalo & Mississippi Railroad to run from Toledo to Michigan City on Lake Michigan was secured. In July, 1849, I was withdrawn from the C., C. C. & I. and sent to Laporte, probably for Legislative purposes, and directed to get a grade of 20 ft. to the mile from Laporte to Michigan City; but always keeping my right eye on Chicago. Now Laporte is some 4 miles south of the divide between Lake Michigan and the Ohio River waters, and is several hundred feet above Michigan City, while the two are only about 12 miles apart. An old line had been located and partly graded on a grade of 75 ft. per mile. I soon found that the 20-foot grade pointed directly toward Chicago. So I ran my line to Bailytown, 20 miles to the foot of the grade, then turning on an acute angle to the right, I ran back 20 miles more on a perfect plain to Michigan City. This was the main line, and was approved and finally constructed. Next, Goshen was a town out of the way, but had great legislative influence, so I was next sent there to run a line thence to Coldwater, Mich., to connect with the Michigan Southern, which had in the meantime been acquired, and Mr. Hubbard had located and was constructing the division from Hillsdale to Coldwater. Next, I was sent to locate the Michigan Southern from Coldwater west, still keeping my eye on Chicago. Centreville and Constantine were points in the line, but they were not in my eye. So we secured an engineer from Detroit and put him on this line, while I made for the southern bend in the St. Joseph River at Bristol and thence on to Laporte. Constantine was out of the line, much to the disgust of General Barra and the ancients, so a four-mile branch was run to that place; and Goshen was ten miles out, and they, too, were appeased by a branch, and I pushed on to Laporte. Then taking up my line at Bailytown, I pushed past the south end of Lake Michigan and run two lines into Chicago; one on the route afterwards occupied by the Pennsylvania road, and the other by the Michigan Central. It was afterwards that the present entrance between the two was determined upon. About these days it was said by some that by means of John Stryker's sweet words and sparkling champagne and Elisha Litchfield's boodle, the legislatures were "fixed," and the "Michigan Southern & Northern Indiana Railroad Co." was born, and the Buffalo & Mississippi was laid away to sleep with the Ohio Railroad.

About September, 1850, construction in earnest began, and I was placed in charge of the Michigan Division and Mr. Hubbard of the Indiana Division. In the frost and snows of the winter 1850-51, I was laying track in the Hog Creek woods, reaching Sturgis early in the spring of 1851. We were not troubled with red tape in those days: a visit from the chief engineer, new president and some of the directors once or twice a year was all the interference I had with my proceedings. I made my own locations, procured the right of way, let the contracts and paid the bills, money being sent me on my own requisition in crisp New England bank bills. I sent my monthly settlements and vouchers first to Mr. Harback and after that to 14 Williams street, New York. About this time there was a new deal. A meeting of promoters (I will call them) was held at Elkhart, to which I was summoned with my plans, profiles, estimates and progress. Here was Geo. Bliss, General Hunt, Charles Butler and F. Harback, Elisha and Edwin Litchfield, John Stryker and John B. Jervis. I was informed by Mr. Harback that he was out of the concern and that Mr. Jervis was the chief engineer, who desired that I should remain and go on with the work as I was doing; but that I was at liberty to retire with him if I chose. My intercourse with Harback had always been exceedingly agreeable and without the least jar. Still I had become deeply interested in the enterprise and the work and decided to stick and fight it out on that line. From this I went on with the work as before as "Assistant Chief Engineer," reporting results and getting advice from John B. Jervis in New York. I have often wondered at my temerity in those days, receiving and paying out hundreds of thousands of dollars without even so much as a safe in my office. Once I remember spending the whole day in the field, while ten thousand dollars lay in my trunk unlocked in my room at the hotel. Engineers had to be created in those days. Axemen were turned into chainmen, chainmen into rodmen and rodmen into levelers in rapid succession as they proved their efficiency. On the Indiana Division war broke out between our road and the Michigan Central. Both parties seemed to think that there was room for but one road into Chicago, and each did their best to keep the other back, resulting in two crossings, and finally in a terribly destructive collision between two trains at the crossing near Chicago.



THE CURRIER DRAW-BRIDGE ENGINES.

All this time the "flat bar" was used from Hillsdale to Monroe and from Adrian to Toledo. As soon as our last spike was driven, at the state line, we repaired to Adrian and rebuilt these roads, substituting the T rail and extending the track from the town of Monroe across the marsh to the mouth of the river, and there built the docks and eating-houses for the palatial steamers, the Northern Indiana and Southern Michigan, the Western Metropolis and the Buffalo, which connected us with the canals and roads of New York. Then we moved on to Toledo. In the mean time a third Litchfield and his associates were building the Cleveland & Toledo road terminating on the bank of the Maumee opposite our little station on Water street. Here the business had outgrown the conveniences and enlarged quarters must be provided. The "middle ground" was selected as the terminal and I was directed to get there.

A circuitous line crooking around among the streets of the city had been surveyed. I had been accustomed to deal with straight lines, so here again I took the bull by the horns and, starting some 4 miles out, I struck a tangent so as to clear the bend of Swan Creek and dive under the canal just above the lock, showing a deep blue clay cut for three-quarters of a mile. This project looked large in those days of small things; but the advantages were too obvious to be rejected and the work was undertaken. The middle ground was all under water, the shallowest being 4 ft. A pile track was driven three-quarters of a mile from the shore to the extreme end of the middle ground. Steam excavators were placed at the cut and this heavy cut of blue clay was transferred to the middle ground to make land, and fourteen acres where the new passenger house now is were acquired for the material with which to complete the filling. The dock line was established at 12 ft. water. A tight row of piles was driven and tied back to others, fascines were placed to cover the cracks and the docks were then filled in with clay. The bottom of the middle ground was a rich muck. It inclosed a bayou of stagnant water very prolific of frogs and malaria. Without the help of the divining rod, I had reason to think that we might find, by boring, other water than the Maumee. I drove a foot square box into the mud, the top coming above the water, and bored inside of it 60 ft. Here we struck boulders and coarse gravel, and below them the lime rock, when up came a stream of pure, clear water, with just enough sulphur in it to be distasteful to the "bacteria." This pure fountain had much to do with the health of the engineers and workmen, who had to work in and above the Maumee filth. We were not allowed to interrupt the navigation of the canal, so we built in the winter a temporary aqueduct over our works to carry the canal. Our cut cleared the canal lock but a few feet, and our foundation was lower than that of the lock. When our excavation was well out, a flood came, and the canal took a new departure and sought the Maumee through our cut instead of its own channel. We were forced to lock the boats down into the Maumee 12 miles above and tow them down to Toledo all one summer, by which time we had completed a double arched culvert or roadway for our tracks. The state forced us to give 6 ft. water-way, so the crown stones of our arches were only 10 in. deep. Over this we laid in cement a 2-in. course of brick. In the midst of it all the cholera broke out with great vigor. East Toledo was entirely depopulated, and from my back office window I saw the freshly-filled coffins passed out of the windows of the houses below. I slept in a bedroom off my office alone. A bottle of cholera medicine by the side of my bed was perfectly effectual without being uncorked. Persistent human effort accomplished its purpose in spite of opposing forces. So this middle ground station was completed, and we got out of the Maumee Valley on a straight line and on a 20-ft. grade. The Island House was built for an eating house and boarding houses for the officers of the road and the trainmen. It was afterwards turned into a hotel.

* * * * There began now to be whisperings of another road from Toledo west, and the company determined to forestall it. So I was told to unite Toledo and Gosben by an air line as near as practicable. Bryan, the county seat of Williams County, was the only town in Ohio worth considering. A slight deviation to the south carried us within a half mile of this place, and besides, by this line I could reach an important feeder of which for a time I was chief engineer. So beginning at the top of the grade and at the bend of Swan Creek, at what is now Air Line Junction, I planted the transit and setting the first flag ahead, directed the party to fight it out on that line until they heard from me again. On this line they pushed through a dense forest with only here and there a slight clearing, week after week, past Bryan and on to the state line and four miles beyond to a junction with the Eel River Valley road, the feeder mentioned above, a single tangent a degree of the great circle of the earth,—one three hundred and sixtieth of the entire distance around the globe.

On going over this line carefully, I could not find where I could save expense or grade by changing the line or breaking it up, and the road was built on that first line. I am bound, however, to acknowledge that the line is not a straight line. A practical eye will discover when a locomotive is seen four or five miles away that it appears north of the rails near you. The deviation was always in one direction—to the south, and nearly uniform, and I made it quite so when the land was cleared so that I could so. The line was run with great care, reversing the instrument at all the changes, and passing obstructions by offsets on parallel lines, instead of deflections. If this error had been sometimes to the right and sometimes to the left, it might be laid to carelessness; but being always to the left, the cause would seem to be a constant influence. My explanation is that the observer, when he takes his back sight, is always on one side of the instrument, and when he takes his foresight he is on the other, and his weight upon the elastic earth causes the change. In studying the question, I have only been awakened to this fact, that is if, in middle latitudes you start to run due west and continue a true straight line around the earth, you will come back to your starting point; but it will not be an east and west line in a parallel of latitude, but will be run in a great circle crossing the equator twice on the way.

But to return to our line; this junction I named Butler, after one of our directors, and bought for the two companies a quarter section of land. The Eel River Valley road extended from this point to Logansport on the Wabash over a natural route for a road, reaching Logansport in some four miles less distance from Toledo than by the Wabash Valley road.

The Eel River Valley was an independent road; but it was favored by the M. S. & N. I. who sent me there as its chief engineer to locate it, and I sent one of my assistants there to build it. The air line was planned as far as that point, for a double track, on account of the double business from Chicago and St. Louis it was expected to meet at Butler. By some sort of occult influence, the directors of the M. S. & N. I. road all at once declined to advance the iron for Eel River, and some of them secured the contract to furnish the iron for the Wabash road, a strictly competing line. The Eel River slept until many years after the Michigan Central took it up and carried it to Detroit. With the practical completion of the air line my connection with the great enterprise ended. This was in 1854. I had spent five continuous years upon the construction of this great undertaking. It has continued to grow and is still growing. It has lopped off from its name its tail, Northern Indiana, and grafted on its present head, Lake Shore, and has swallowed its neighbor, the Nickel Plate. Its projectors possessed but a few hundreds of dollars, its present owners possess a few hundred millions, and yet not a half century has passed since the honest, quiet, old Quaker, Nehemiah Allen, first dreamed of a railroad along Lake Erie as possible. But neither he nor the most sanguine dreamed that 125,000 miles of railroad in these United States would be built in these 50 years, or that Cleveland would increase in the meantime forty fold—4,000 per cent. Who shall set bounds to the acquisitions of the next 50 years?

The Currier Drawbridge Engines.

The accompanying cut shows the new 12 × 12 in. double reversible engines, with friction attachments, built by C. Currier & Sons, of Newark, for the Pennsylvania Railroad, to be used on the drawbridge at Commercial street, Newark. One of the principal improvements is that the engineer, standing at the hand-wheels, can drop a danger signal 500 ft. away, unlock the bridge, and turn the draw without moving over a space of two feet. The engine, with the exception of base, cylinders, stand and disc, is made entirely of the best cast steel. With a pressure of 30 to 40 lbs. of steam, the draw, weighing 450 tons, and measuring 400 ft. in length, can be turned in less than a minute. With the same boiler, the old machinery required 65 to 75 pounds to do the work, and took from three to five minutes.

Train Accidents in August.

COLLISIONS.

REAR.

1st, a. m., on Fitchburg, near Athol, Mass., freight ran into rear of a preceding freight which had stopped near the station during a dense fog, wrecking the caboose and one car.

2d, a. m., on Chicago & Northwestern, near Devil's Lake, Wis., freight ran into a working train standing at the station, wrecking caboose and sleeping car of the latter, killing 2 men and injuring 3.

3d, on Wabash Western, in Warrenton, Mo., a passenger train was run into by another passenger train, damaging an engine and several sleeping cars.

4th, a. m., on Fitchburg, near Porter's station, Mass., freight ran into rear of preceding freight, derailing and wrecking several cars and damaging the engine.

5th, a. m., on Fitchburg, near Greenfield, Mass., passenger train ran into the engine of a construction train standing on the main track; both engines badly damaged and 2 passengers hurt.

7th, on Chicago, Burlington & Quincy, in Greenville, Ill., freight ran into the rear of a preceding freight, doing considerable damage.

8th, a. m., on New York, Susquehanna & Western, at Paterson, N. J., a passenger train ran over a misplaced switch and into some cars on a side track, damaging the engine and one passenger car.

9th, a. m., Atchison, Topeka & Santa Fe, in Los Angeles, Cal., switching engine ran into a sleeping car standing in the yard, damaging it badly.

11th, a. m., on New York, Lake Erie & Western at Port Jervis, N. Y., a freight train coming into the yard ran into the side of a car of an excursion train which was crossing over from the adjoining main track. The car was full of passengers and it was partly overturned, but the passengers all escaped injury.

12th, a. m., Chicago, Burlington & Quincy at Montgomery, Ill., freight ran into rear of a preceding freight damaging several cars and injuring four trainmen.

13th, on Cincinnati, New Orleans & Texas Pacific, near Chattanooga, Tenn., several cars in a freight train broke loose and ran back into a following train. One brakeman killed.

16th, night, on Lehigh Valley, at Three Bridges, N. J., freight ran into rear of preceding freight, wrecking the engine and sixteen cars; engineer and fireman hurt.

17th, on Union Pacific, at Dodge City, Kan., a passenger train ran into the rear of a freight, damaging an engine, caboose and 3 freight cars, fatally injuring a trainman.

17th, night, on Baltimore & Ohio, a freight ran into rear of a preceding freight near Ellicott City, Md., wrecking 17 cars and fatally injuring 3 trainmen.

18th, night, on Pennsylvania Railroad, a shifting engine ran over a misplaced switch, and into an engine standing in the yard at Broad street, Philadelphia, Pa., throwing both men of the latter out of the cab; engineer fatally and fireman slightly injured.

The shock opened the throttle of the standing engine, and it started and ran at high speed across the Schuylkill River, when it collided with another engine, the engineer of which was also thrown out of the cab and severely injured. The throttle of this engine was likewise opened by the force of the collision, and both engines ran on toward the Philadelphia, Wilmington & Baltimore junction, where they ran off and over an embankment, wrecking them badly.

19th, early, on Pennsylvania Railroad, near Wynnewood, Pa., a fast freight ran into a preceding freight, piling up the engine and 14 cars in a bad wreck. Engineer, fireman and conductor slightly injured by jumping from the train.

19th, p. m., on New London Northern, a switch engine ran into some freight cars left by mistake on the main track in the yard at Norwich, Conn., and was derailed.

23d, on Illinois Central, near Blairsburg, Ia., a freight ran into the rear of a construction train, derailing engine and several cars.

23d, night, on Connecticut River road, near Springfield Station, N. H., a heavy freight train descending a heavy grade ran into the rear portion of a mixed train, which had become detached from the forward portion and had been stopped. The passengers had all got out of the car before the collision occurred.

24th, a. m., on New York, Lake Erie & Western, in Buffalo, N. Y., a passenger train ran into and damaged a Lenigh Valley mail car.

24th, a. m., on Central of New Jersey, in Cranford, N. J., a freight train standing on the main track was run into by a following coal train, damaging the engine and piling 15 cars up in a bad wreck. A dense fog prevailed at the time.

24th, noon, on Wheeling & Lake Erie, at Fremont, O., a freight just pulling out of the yard ran over a misplaced switch and into a coal car, pushing it off the end of the track into a mill race. Engine badly damaged.

24th, on Chicago, Milwaukee & St. Paul, at Wabasha, Minn., a passenger train ran into the rear of a freight, doing some damage.

25th, on Missouri Pacific, in Atchison, Kan., a switch engine ran into a freight, damaging 3 cars. A barrel of kerosene in one of the cars exploded and fired the wreck, which, with several cars and a bridge on which the accident occurred, were burned up.

25th, night, on Indiana, Bloomington & Western, near Lynn, Ind., a freight train broke in two, and the rear section ran into the forward one, wrecking several cars.

27th, on Illinois Central, in Irvington, Ill., a passenger train ran over a misplaced switch and into a freight standing on a siding, wrecking an engine and several cars, injuring a trainman.

27th, early, on Philadelphia & Reading, a passenger train, which had stopped at Wayne Junction, Pa., was run into by a closely following engine and caboose. The rear sleeping car and the caboose were badly damaged; brakeman killed, and 2 other trainmen severely injured.

28th, night, on Pennsylvania Railroad, near Pemberton, N. J., a passenger train ran into some freight cars which had been left projecting over the main track, doing considerable damage.

30th, very early, on Pennsylvania Railroad, near Altoona, Pa., the rear portion of a freight, which had been cut in two in Gallitzin Tunnel to do some switching at the west end of the tunnel, was run into by a closely following freight, wrecking 2 engines and 12 cars. The operator in the telegraph tower at that point supposed the forward section to be all of the train and telegraphed to the east end of the tunnel for the next train to come on.

BUTTING.

2d, night, on Cleveland, Columbus, Cincinnati & Indianapolis, near Dayton, O., butting collision between a freight train and some cars being pushed by a switching engine. Several cars badly damaged.

3d, on Burlington & Missouri River, near North Bend, Neb., butting collision between two freights; both engines and thirteen cars went over a bank and into the North Platte River. Two tramps, stealing a ride, were killed. A mistake in orders is said to have been the cause.

3d, p. m., on Evansville & Terre Haute, near Evansville, Ind., butting collision between a freight and a switching train, badly wrecking both. The switcher appears to have been running on the regular freight's time.

3d, p. m., on New York, Lake Erie & Western, at Goshen, N. Y., butting collision between a freight and a switching engine. Both engines and several cars badly damaged. The switcher had a flag out but it was not carried far enough.

8th, a. m., on Buffalo, Rochester & Pittsburgh, near Whistletown, Pa., butting collision between two freights, badly damaging both engines. An operator's blunder is given as the cause.

8th, p. m., on East Tennessee, Virginia & Georgia, near Chattanooga, Tenn., butting collision between passenger train and switching engine, making a very bad wreck. Engineer and fireman of passenger train fatally injured, and several passengers hurt.

9th, very early, on Pennsylvania, near White Hill, N. J., butting collision between two freights. Both trains were running fast and were piled up in a very bad wreck; one fireman was killed and four other trainmen were badly hurt. It is said that an operator failed to notify one of the trains to stop.

9th, on Atchison, Topeka & Santa Fe, in Los Angeles, Cal., butting collision between two passenger trains, damaging both locomotives. Misunderstanding of orders is given as the cause.

13th, on Louisville & Nashville, near La Grange, Ky., a butting collision between a passenger train and a freight wrecked 2 engines and derailed 4 stock cars.

13th, p. m., on Erie & Wyoming Valley, near Greenville, Pa., butting collision between empty engine and freight train, injuring three trainmen. It is said the runner of the empty engine disobeyed orders.

15th, on Missouri Pacific, near Greenwood, Mo., a butting collision between two freight trains made a bad wreck; engineer and fireman injured.

16th, p. m., on Kansas City, Fort Scott & Gulf, near Lenexa, Kan., a butting collision between a passenger and a freight train wrecked both locomotives and damaged several cars. Cause, mistake in orders.

17th, a. m., on Pennsylvania near Stelton, N. J., a freight train in backing collided with a standing train behind it, derailing 5 cars and blocking three main tracks.

17th, a. m., on Intercolonial, near Riviere-du-Loup, as an east-bound freight was about to enter a side track, it was struck by a freight train coming from the east, completely demolishing 5 cars. The west-bound train was descending a grade, and, according to the statement of the runner, the locomotive had become uncontrollable by the breaking of a lever.

18th, early, on Chicago, Burlington & Quincy, near Naperville, Ill., a butting collision between two freight trains badly wrecked both engines and several cars, killing a considerable number of cattle and hogs. There was a dense fog at the time.

18th, on Union Pacific, near Valley, Col., a freight broke into three parts, which afterwards ran together, wrecking several cars.

18th, on Wabash Railway, near Worth, Ill., a butting collision between two freight trains, derailing both engines and several cars. Disregard of orders is said to have been the cause.

19th, very early, on Central Railroad of New Jersey, in Mauch Chunk, Pa., a freight train ran over a misplaced switch and into the head of another freight which was moving on the adjoining main track, wrecking both engines and several cars. The accounts say that the switch was without a signal light, preventing the engineers from seeing whether it was right or wrong.

19th, a. m., on Grand Trunk, near Aylmer, Ont., butting collision between two freight trains, wrecking a number of cars in each; one brakeman injured.

19th, on New Jersey Southern, near Bay Side, N. J., a butting collision between a passenger and a freight train, doing slight damage.

19th, night, on Pittsburgh, Ft. Wayne & Chicago, near Massillon, O., a butting collision between 2 freights wrecked 2 locomotives and damaged 6 cars.

20th, on East Tennessee, Virginia & Georgia, near Athens, Tenn., butting collision between an empty engine and a freight, killing 1 trainman and injuring another.

21st, night, on Chesapeake & Ohio, a butting collision between 2 freights, near Charlestown, W. Va., totally demolished 2 engines and piled 15 cars up in a bad wreck, which caught fire and were consumed. It is said that the accident was caused by an operator falling asleep.

22d, p. m., on New York, Lake Erie & Western, a misplaced switch caused a butting collision between local passenger and construction trains, a short distance west of Bergen Tunnel, N. J. Engines and several cars damaged.

23d, early, on Virginia Midland, near Culpepper, Va., a butting collision between a passenger and a freight wrecked both engines and several cars; 2 trainman fatally injured, 3 others severely, and 1 passenger slightly.

23d, p. m., on Baltimore & Ohio, near Round Bay, Md., a butting collision between a passenger and a freight train; engineer killed.

23d, evening, on Baltimore & Ohio, at Woodbine, Md., a butting collision between a passenger and a cattle train wrecked 2 engines, derailed and damaged 15 cars; engineer killed and a fireman fatally injured.

24th, morning, on Baltimore & Ohio, at Easton's Siding, W. Va., a butting collision between a passenger and a freight train damaged both engines, killed 2 trainmen, and injured 2 other trainmen and 15 passengers more or less severely. The engineer of the freight thought he had the right of way and pulled out of the station just as the other train came up.

26th, a. m., on Belt Railroad, in Chattanooga, Tenn., a butting collision between a passenger and a freight injured 10 passengers seriously and 15 others slightly. Cause: freight engineer's watch 4 minutes slow.

28th, early, on West Shore, near Port Byron, N. Y., a butting collision between the second section of a passenger train and a freight, badly wrecked 2 engines and several cars, the tender of the former train telescoping the baggage car, killing the baggageman and seriously injuring the conductor. Engineer jumped and was severely injured. It is stated that the freight waited for the first section, but for some reason failed to wait for the second.

28th, on Pittsburgh, Fort Wayne & Chicago, near Lima, O., butting collision between two freights, badly wrecking both. It is said the telegraphic orders were conflicting.

30th, early, on Central Pacific, in Chico, Cal., a butting collision between two passenger trains badly wrecked both engines and slightly injured a passenger. It is claimed that the air brakes on one of the trains were defective, having been injured a few minutes previous when the train ran over a horse.

30th, early, on Grand Trunk, near Shannonville, Ont., a butting collision between two freights, badly wrecked both engines and quite a number of cars.

31st, p. m., on St. Paul & Duluth, in St. Paul, Minn., a butting collision between a passenger train and a wild engine, wrecked 2 engines and a baggage car, injuring the engineers fatally.

CROSSING.

5th, p. m., on Northern & Northwestern, near Milton, Ont., 16 cars of freight broke loose near the top of a grade and ran back four miles to the crossing of the Canadian Pacific and struck the middle of a cattle train which was crossing at the time, completely wrecking both trains. The conductor of the runaway train was fatally injured.

DERAILMENTS.

DEFECTS OF ROAD.

2d, on St. Louis, Arkansas & Texas, near Garland City, Ark., an engine and several cars of a freight train were thrown into the Red River by the breaking of a bridge, seriously injuring the engineer and fireman.

9th, on Chicago & Northwestern, near Pierre, Dak., 5 cars of a freight went through a trestle which had been weakened by a freshet and were wrecked.

10th, night, on Toledo, Peoria & Western, near Chatsworth, Ill., an excursion train of sixteen cars drawn by two engines, struck a short trestle bridge which had been seriously injured by fire. The first engine went over in safety, but its tender and the following engine and the first ten cars were piled up in a very bad wreck. The trucks of the cars were detached from the bodies as they came to the opening and the bodies were completely domolished and crowded into a space lengthwise of less than 200 ft. The six rear cars stopped before they reached the bridge. The train contained about 600 passengers, the larger part of them being in the cars that were demolished. The official report of the road (Sept. 20) places the number of killed at 80, and of the injured 151, of whom 10 were employés. The first accounts estimated that 250 were injured. The road probably reports only such as made formal complaint. Flames started in the wreck but were extinguished by survivors, who had to scratch up earth with their fingers for the purpose. The men on the forward engine say that they first noticed the fire somewhere from 20 to 500 ft. before reaching the bridge, but had no time to slacken the speed or give a warning signal. The air brake of the train did not communicate with the forward engine. The weather had been very dry for a long time, and the trackmen had been burning grass on the roadside that afternoon. No train had passed over the road for six hours previously.

11th, a. m., on Buffalo, New York & Philadelphia, near Brockton, N. Y., passenger train derailed by spreading of rails where repairs were in progress. In contrast to many reports of this kind of late, the account states that the air brakes were in perfect condition and that the train was stopped almost immediately.

12, a. m., on Pennsylvania, near Parkersburgh, Pa., engine and twelve cars of freight train derailed by a broken frog.

12th, a. m., on Evansville & Indianapolis, at Saline City, Ind., passenger car in a mixed train derailed. Six passengers were injured. It is said a culvert gave way under the train.

21st, on Southern Pacific, near Saugus, Cal., an engine and 6 cars of a passenger train were derailed by the spreading of the rails, the baggage and smoking car going over a high embankment, injuring 5 passengers more or less severely.

23d, p. m., on Peoria, Decatur & Evansville, near Mt. Pulaski, Ill., a passenger train was derailed on the bridge over Salt Creek, by the spreading of the rails, the fastenings of which had been removed apparently for the purpose of wrecking the train.

24th, on Fremont, Elkhorn & Missouri Valley, near Johnstown, Neb., a passenger train derailed, wrecking the engine and first 2 cars, killing the fireman and injuring the engineer. It is said the trackmen in making repairs left the track insecure.

24th, night, on Union Pacific, near Denver, Colo., the engine and baggage-car of a passenger train went through a bridge near Sandy Creek, the middle section of which had been washed away by a freshet. The engineer went down with the wreck and was killed, fireman and baggage-man seriously injured, and a tramp stealing a ride on the front end of the baggage-car fatally injured.

26th, p. m., on Louisville & Nashville, near Warrior, Ala., the engine and several cars of a freight were thrown from the track by a broken rail, killing an engineer riding on the engine to learn the road, and fatally injuring the regular runner.

28th, early, on Southern Pacific, near Acton, Cal., a passenger train struck a broken rail, and the engine and four cars were ditched. A tramp stealing a ride was slightly injured.

29th, early, on Cleveland & Mariet a, near Cambridge, O., the last 3 cars of a freight broke through a trestle, which had caught fire in some way and had been partially consumed. Two trainmen jumped and were seriously injured.

30th, on Illinois Central, near Weldon, Ill., freight train derailed by a defective switch; two trainmen injured.

DEFECTS OF EQUIPMENT.

2d, early, on Georgia Pacific, near Henry Ellen, Ala., a freight was derailed by a fallen brake beam and went off a high precipice, killing 1 and injuring 2 brakemen.

2d, on New York, Lake Erie & Western, near Port Jervis, N. Y., the tender of a freight engine was derailed by one of its trucks breaking.

3d, on Baltimore & Ohio, at Bloomington, Md., freight derailed, injuring a brakeman and killing a tramp. The cause is reported to have been a flat wheel.

3d, night, on Pennsylvania, in Carpenter's Tunnel, near Ardara, Pa., freight derailed by broken axle piling up 11 cars in a bad wreck and blocking the tunnel 6 hours. One brakeman fatally hurt.

6th, on Louisville & Nashville, near Banger, Ala., engine and eleven cars of a freight derailed and wrecked by the cow-catcher of the engine dropping on the track. Fireman killed, two other trainmen injured.

18th, on Boston & Maine, in Nashua, N. H., draw-bar in a freight train pulled out and, falling on the track, derailed 8 cars.

22d, early, on Missouri Pacific, near Lohman Station, Mo., 7 cars of a construction train were derailed and wrecked by a drawhead pulling out and dropping upon the track; brakeman and a laborer slightly injured.

22d, night, on Missouri Pacific, near Denison, Tex., 8 cars of a stock train were derailed by a broken brake beam and wrecked, killing a brakeman.

29th, night, on St Paul, Minneapolis and Manitoba, near Wayzata, Minn., a broken axle under a car near the front end of a freight derailed a number of cars and piled them up in a bad wreck, blocking the track for some time.

NEGLIGENCE IN OPERATING.

8th, a. m., on Wabash Western, at Missouri City, Mo., freight derailed by misplaced switch. Two tramps sleeping in a box-car were killed.

17th, a. m., on Baltimore & Ohio, in Washington, D. C., the engine and 4 cars of a passenger train, running at very high speed, left the track at a sharp curve and crashed into a brick signal tower, making a complete wreck. The signalman jump out of an open window and escaped with a broken arm. The engineer was killed, and the fireman and 16 passengers were more or less severely injured. It is claimed that the brakes failed to work properly and that the train could not be controlled.

20th, night, on Valley Railroad, in Hawkins, O., in attempting to make a flying switch several freight cars were wrecked and the station building completely demolished, one of the cars, it is reported, being hoisted in the air and thrown squarely on top of the structure.

27th, night, on Fremont, Elkhorn & Missouri Valley, near Ainsworth, Neb., a stock train struck a hand-car loaded with iron, wrecking engine and 2 cars; fireman killed, engineer badly injured.

29th, on Chicago & Northwestern, in Watertown, Wis., several cars in a freight train derailed in the making of a running switch.

18th, very early, on Boston & Albany, at Milford, Mass., the engine of a freight cut loose from the train and ran ahead to back in on side track; the engineer, who was not very familiar with the road, heard the train following him too closely and jumped from his engine, fearing a col-

(*Continued on page 640.*)

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

A day or two before the recent offer of the government to buy $14,000,000 of bonds, Mr. H. V. Poor addressed to the President a letter in which he points out that the recent investments in building railroads is alone sufficient to account for the stringency in the money market. His estimate is that $420,000,000 has been spent, or will have been spent in 1886 and 1887 in the construction of new lines, not including equipment, or about $271,000,000 more than the cost of the construction of 1884-5, and that the cost of moving the tonnage of the entire railroad system of the country in 1886-7 will exceed that of 1885-6 by nearly $134,000,000. He further estimates that the increased expenditure in construction and operation has caused an increased outlay in other departments of production and trade throughout the country of $100,000,000 in 1887 over 1886. Mr. Poor points out that never before in our history has the construction of railroads been conducted so legitimately and with such care and economy as in the past and present year. The mileage has not been made up of speculative enterprises, but almost wholly of extensions into the newly settled portions of the country. He argues that as the government long ago assumed paternal functions with regard to money its duty now is to *anticipate* the needs of the country. The inference from his argument is that the Secretary of the Treasury should do what he has already done to relieve the financial stringency. How far Mr. Poor's letter was influential in hastening the step taken cannot be known, but presumably it had a certain effect. But probably Mr. Poor would not have the government action stop with the executive. Any relief from that quarter can only be an expedient, and temporary. The real relief, if it is to come from the government at all, must come through Congress, and the advantage of a special session to consider the situation is great. At least Congress and the country would know the purpose of the session, and responsibility would be put where it belongs. Congress would have to face the problems which it has so resolutely shirked, or say to the country that it dared not face them. But whatever is done, it is of first importance that the policy of the government should be fixed and made known. Business can be adjusted to a bad government policy, if people know what that is to be; but now we live from hand to mouth, and as no one knows what is to happen after October 8, much of the good of the bond purchases is lost.

The recent collision at Doncaster, England, was occasioned by the stopping of the train for the purpose of collecting tickets. This seems to most American railroaders somewhat like a wanton invitation to disaster. It should indeed be safe for a conductor to stop his train anywhere for any length of time, provided he does not disregard rules; but yet one stopping without good reason would generally be regarded as deserving of a portion of the blame for any ill consequences. The inconvenience of cars without lengthwise passages and end doors, seems so patent that their continued use in England will always be a source of wonder to Americans, but even in this country where we have every facility for reaching all the passengers while the train is moving, we are far from perfect in the matter of fare collecting. Only a short time ago we chronicled a collision (in Michigan, July 4) where an engine crashed into the rear of a passenger train, which the reports said had been stopped for this same purpose; and occasions on which conductors have requested the engineman to waste time on the road because they had before them a task which they were unable to cope with, will be recalled by any one familiar with train running. There have been, we believe, accidents in England heretofore at places where trains were habitually stopped for ticket-taking. It may seem to be an unwarranted care and expense, and like "figuring on too fine a point," to have properly qualified men at various points on a road in sufficient number to provide for all the sudden calls conductors might make for helpers; but the constantly-recurring accidents which result from defective discipline or management are forcible reminders that it is little things to which attention must be given if the blackness of our manslaughter record is to be mitigated. It would not be such a very hard thing to provide for the proper taking of tickets under all contingencies; the employment of train-collectors is a step in the right direction, and the experiment of having such an officer has been tried in various places, and we believe is still in operation on one road. Moreover, there is ample room for improvement in the whole business of fare collecting, merely on immediate financial grounds.

We would call attention to the letter of Mr. Charles Francis Adams, written to the Brotherhood of Locomotive Engineers, an extract from which is printed in another column. It confirms much that we have said of the relations of the great railroad corporations to their employés. He states some of the causes of the unsatisfactory conditions which actually exist, and suggests in the way of remedy more careful selection, more certain tenure of employment, regular promotion for merit and provision for retirement with pension. The great practical difficulties in the way of working out such a system are also suggested by the fact that a man holding the views that Mr. Adams does, and in the position in which he is now placed, finds his thought and energies all absorbed in the more pressing work of the moment.

The discussion by the Western Railway Club last week on the subject of piece work in shops, marks progress, even though it be not great. Mr. Casanave's position and experience were made known to our readers by the admirable series of papers on the subject which he contributed to our columns some months ago; but he gave evidence of his continued and unwavering faith in this reform, in which he is so far ahead of most railroad officers, and drew out expressions from other practical men. The testimony of the Chicago, Burlington & Quincy men corroborating Mr. Casanave's was interesting, and makes one wish for fuller information as to the cost and the difficulties of introducing and maintaining this system. If prices of work can be changed, when there are good reasons for so doing, without creating dissatisfaction, one of the chief bugbears is removed by the testimony at this meeting. Actual comparisons on an extended scale are greatly to be desired, and it is to be hoped that Mr. Casanave and Mr. Rhodes will both favor the railroad world with some further figures. The different sort of talent needed in foremen or inspectors is a very important consideration, as also the proper principles on which should be based the salaries of these men. One speaker at the meeting suggested that selfishness—the disposition to look out for one's self—was strong enough in men already, and that we ought not by this stimulating plan to cultivate it still more. It must be remembered, though, that most of the real, lively work of the world is done by men inspired by an enthusiastic desire to promote their own interests. But while looking out for number one is such a common trait, and one that can be appealed to without fail, there are still places (as a foreman's) where the man's honor must be largely depended upon to insure just dealing; and the effect on such positions as these when work is done by the piece, is worth attention. A foreman is somewhat like a confidential secretary, and the rule in hiring the latter is to select the man best fitted for the place, and fix the salary afterward. It appears the Fort Wayne officers do not complain if a man succeeds in making large pay. In fact, the company itself secures a considerable benefit in the larger amount of work done without increase of plant.

THE CENTRAL VERMONT DECISION AND THE FOURTH SECTION.

In their action on the complaint of the Vermont State Grange against the Central Vermont Railroad Co., the Commissioners have at last taken positive ground on a doubtful point, and have defined one very large class of cases where they will not make exceptions, or allow the railroads to make exceptions to the long and short haul clause.

The National Despatch Co., whose cars run over the lines of the Central Vermont, had been obliged to give low differential rates in order to compete with the trunk lines for through freight. Its local rates were in many cases in excess of its through or competitive rates. The railroad claimed that these low through rates were necessary to secure the freight; that this competitive business was not under substantially similar circumstances and conditions with its local business; and that the Commission had already allowed exceptions in favor of such competitive business elsewhere.

The Commissioners did not admit the validity of this plea. They pointed out that the exceptions which they had contemplated as possibly legal were in cases of water competition or competition of foreign roads. But the competition to which the Central Vermont was subject did not belong to either of these classes. It was the competition of domestic roads, equally subject to the law, but possessed of a shorter and more advantageous line. In such cases, say the Commissioners, the longer railroad must submit to the disadvantage of its position. If it wishes to compete for the through traffic, it must lower its local rates accordingly. In other words, the Commission may allow exceptions in the case of competition from transportation agencies beyond the reach of the law, but it will not admit such exception where all the competing parties are equally subject to the law. They do not take the position of the English Parliamentary Committee of 1882, and say that "a preference is not unjust so long as it is the result of fair business competition." They put their exceptions on a totally different ground. They hold that the law intended to stop local discrimination just as far as was possible, without reference to the question of competition; but that where you have a powerful foreign competitor it may be impossible to stop it by domestic enactments. In these and similar cases, the enforcement of the law may hurt our railroads without correcting the evils which it was intended to meet. Where the enforcement of the law would simply hurt the roads which were responsible to the Commission, for the benefit of other transportation agencies which were not thus responsible, the least harm was done by exempting them all from its operation. It was not the competition but the inequality of control which furnished the real ground for the exception.

We believe that the Commissioners are unquestionably right in what they have done in this case. We do not mean that we think the law on this point, as thus interpreted, altogether satisfactory; but we mean that, the law being what it is, the Commissioners did the best they could to carry out its general intent with the least possible injustice. In fact, they could not do anything else. To have interpreted it more loosely would have made it unmeaning. To have interpreted it more strictly would have made it unenforceable. At either extreme it would have become a dead letter.

It remains to consider what will probably be the effect of this decision upon the future policy of the railroads. If strictly carried out it will tend to confine the through traffic to the shorter routes, or to those which are able to handle it to the best advantage. A circuitous line making competitive rates for through traffic is obliged to reduce its rates correspondingly on some of its longer local traffic. The longer the haul the less the profit on the through traffic, and the greater the loss from the reduction at intermediate points. The tendency of the law would be to crowd the strongest routes with through traffic to their utmost capacity at the expense of the weaker ones.

But this course of events would almost necessarily provoke a reaction. If the weaker roads suffered really serious losses in this way, they would be sure to try and evade the law. There has been this difficulty with every attempt to maintain rates in the past. The weaker the road, the stronger was its attempt to cut rates. The bankrupt or semi-bankrupt roads were worst of all in this respect. When a road gets into serious financial difficulties, no agreement will control it; and it seems doubtful whether the law itself will be strong enough to do so. It may, and probably will, prevent open disobedience of its provisions; but it is hard to see how it can prevent systematic underweighing, false classification, or other devices by

which the law is evaded. Such evasions are practiced to-day, even when the law is new and while the unprofitableness of the rate cutting of 1885 is extremely fresh in men's minds. We must not overlook the danger of their being practiced on a far larger scale if the weaker roads can secure through traffic in no other way.

In theory it is true that all railroads in the United States are equally under control of the law. In point of fact the bad roads are less under its control than the good ones. A road which is responsibly managed feels the necessity of obedience, where a less responsible seeks every chance for evasion. In that case the equality of control which is assumed by the Commission becomes a mere shadow.

Time alone can show in which direction the balance will tend—whether the law will make the strong stronger and the weak weaker, as the managers of some of our best railroads clearly hope, or whether the law will meet the same fate as the traffic agreements of the past and be nullified by the impossibility of holding the weaker roads to its provisions. In the former case, it will prove the most powerful agent in favor of large corporations which has yet been devised. In the latter case, it will be worse than useless for protecting the small shipper. Only so long as we preserve the somewhat precarious balance between the two extremes can the law have anything like the effect which its promoters desired. We may feel sure that the Commission will labor to keep this balance; whether they are strong enough to do it remains to be seen.

THE EDUCATION OF RAILROAD EMPLOYES.

II.

CORPORATION SCHOOLS OF RAILROAD TECHNOLOGY.

In a former article we gave some reasons why railroad technical schools, established wholly independent of railroad shops and offices, could never satisfactorily supply the wants of railroad service. We now wish to offer some considerations in support of our conviction that railroad companies must needs help themselves in this matter, and that it is entirely feasible for them to establish and maintain such schools with great benefit to all their constructive and operative departments.

The ultimate thing to be accomplished is to raise up young men of fair natural ability to enter the service of the company and to transact its business in the most safe and economical manner. A very large part of the knowledge to be acquired can be obtained only by actually doing the work. The rest can best be acquired by systematic instruction and study, where the ordinary school methods which have survived because they are the fittest for the purpose should be employed. When we add the condition that both these kinds of knowledge must be gained at the same time, that is during the same years of the boy's life, and while his schooling is being made possible by means of the scant living he may earn by doing for the company those things he needs to know and which are only to be learned by doing them, the conclusion is unavoidable that the school must be appended to, or run in conjunction with, the company's shops and offices.

The young man who spends the best years of his life, and considerable means, at a technical school, will not begin as an apprentice to learn any of the mechanic trades connected with railroading in order to earn the wages of a journeyman. In fact be can scarcely afford to do it in order to more efficiently prepare himself for the higher positions in these branches of the service. Life is too short, if there were no other reason. Neither can the poor boy, who looks forward to becoming a journeyman mechanic, afford to go off to school to learn the technical science he needs, but which the public schools do not teach. These same arguments apply to young men entering the operating and accounting departments. They all need some schooling which is practically inaccessible to them, for they cannot go after it, even though it were to be had for the going; and at the same time they need a great deal more which can be obtained only in the employ of the company. These two kinds of schooling must therefore be coincident in both time and place, and moreover they must be worked in harmony. Since the practical parts are necessarily given in the employ of the company, the theoretical portion must be supervised and controlled by the same authority. They cannot otherwise be worked in conjunction. Even then the difficulties are great, but not insuperable.

A reasonable plan, therefore, would be to take young men and boys into the service very much as they are taken now, with perhaps more rigid educational requirements than are now demanded. In fact no person should be taken permanently into the service of a railroad company who cannot read and write *some* language intelligently. This should apply even to the regularly employed unskilled labor, as trackmen, for instance. A man who can neither read nor write in this age is apt to be either stupid or vicious, and besides, any permanent employé is liable to be promoted to, or temporarily placed in, positions of individual responsibility, and certainly all persons holding responsible positions should have this minimum of education.

In what follows we shall speak of all those employés who are passing through this preparatory period of combined schooling and practice as juniors. That part of their work which is apart from the shops and offices, and under regular instructors, we shall call the school work, while the time spent in the shops, the offices, or on the line in learning the practical side of their duties, and for which they would probably receive some pay, we shall call the shop work, whether the time be really spent in shops, or in offices, or on the road. What portion of a junior's time should be given to school work and what portion to shop work would certainly vary with the department for which he was in training, some branches of the service requiring a greater ratio of school to shop work than others. Thus, the apprentices who are learning their several mechanic trades might well give but one-fifth of their time, or two hours a day, to the school work, and eight to shop work, while for the master workmen, superintendents and heads of departments the brighter boys would be selected, and probably half their time given to the school exercises.

Or, what would perhaps be still better, let all regular mechanic apprentices give two hours a day to the school work, and when their period of apprenticeship was finished then let the brighter ones be selected for further training for heads of departments. This would apply only to the constructive departments, however. The operating departments might also be worked in a similar manner. Thus the conductors, brakemen, station agents and all office assistants would graduate from the operating department, while the locomotive engineers, firemen, mechanics, draughtsmen, foremen, master workmen, roadmasters and engineering assistants would come from the juniors in the constructive department.

The school work of these two general departments would have very little in common, and might well be carried on at different points. In fact they would usually have to be, for the constructive juniors would have their school work in conjunction with the mechanical shops, while the juniors in the operating department would have to be employed about the general and business offices of the company, and therefore their school work would also best be done here. If the general offices and sufficiently large shops should happen to be located near enough together, then the school work might all be done at one point.

We shall not go into the details of the subjects to be taught in the school part of a junior's work, but simply outline the kind of subjects to which they should give more or less attention, according as they are fitting for higher or lower positions in the service.

In a general way the constructive department students would give most attention to the technical sciences which underlie the various acts of railroad construction and operation, such as mathematics drawing, physics, mechanics, chemistry, nature and strength of materials, structural designing, dimensioning of parts, surveying, laying out and building railroads, bridges, culverts, trestles, yards, stations, warehouses, switch and signal systems, locomotive and car construction, electric plants, etc. It would hardly be economy, on the part of the company, to go exhaustively into any of these departments, for this is the special province of the higher technical schools, and the company could take the products of these schools and work them into their practice cheaper than they could afford to give thorough instruction in these advanced studies. They could well afford, however, to educate the rank and file even of their engineering corps, and then get trained experts to stand at the heads of these departments.

The operative department students would be taught the methods of transacting the business of the road in its various bureaus, both as to actual transportation and the records and accounts of the company. In addition to these detail subjects they should be taught something of the history of railroad development, railroad securities, railroad law and riparian rights, and the larger questions of political and railroad economy.

Thus one course begins with elementary mathematics and ends with some of the advanced problems of engineering and design, while the other begins with book-keeping and business forms, and ends with the larger questions of railroad management, political economy and railroad law. The division and general superintendents should have both of these courses, for their duties cover the whole ground of railroad practice, and knowledge of all departments could be made available.

The shop work of the juniors would be first where they could be most usefully employed, but some effort should be made to make this also as general as possible, consistent with the best preparation for future usefulness. Both this and the school work would be suited to the individual capacities of the boys, those of greatest promise continuing their junior apprenticeship longer, but reaching to higher positions than those of less promise, who would sooner find their level and stop there. Probably no fixed time should be given to this junior stage, the company finding it profitable to continue instruction to one boy for five or six years, while another would be set to his permanent work after a year spent in some part of the school work. The rule would be, that whenever a boy had gone far enough to fit him for the work designed for him, to set him regularly at that business. In this way each boy would be apt to find his true place in the service, an exceedingly desirable, but at present an impossible thing to accomplish.

Perhaps the greatest impediment to the establishment of such schools as here outlined is the necessary chafing and friction which would develop on its inauguration. The division of a boy's time between shop and school involves some kind of divided authority over the boy and his work. Jealous hindrances would also arise in various quarters, and artificial objections and difficulties would be encountered. Still, with wise and temperate management, and a strict observance of both the rights and feelings of all parties, these things would soon vanish, in a great measure. Even the shop-work of the juniors should be in accordance with some system of advancement. It should be *taught* to the boy instead of leaving him to find everything out for himself, as is now the practice. But who is to go into the shops and offices to do this? The present foremen cannot take the time for it, and an outsider would not be tolerated by the foreman who is responsible for the *product* of the boy, but not for the boy's training and advancement.

Probably the true solution of this difficulty lies in engaging assistant master mechanics who shall have certain duties in the shops, or assistant heads of departments, who shall be charged with the intelligent oversight and instruction of the juniors under them, these men outranking the foremen and chief clerks and so forestalling criticism.

In this outline of a school of railroad technology we have been largely guided by what the Baltimore & Ohio Company did and proposed to do, as shown in Dr. W. T. Barnard's recent report. We know that many railroad managers were interested in the experiment, and it is very much to be regretted that the plans of this company did not come to a full development. So far as we can learn, however, the temporary abandonment of the enterprise did not in any way result from a want of confidence in the ultimate success or advantages of such schools, and so we trust it will not retard the evident tendency in the direction of their general adoption.

Passenger Train Men.

In speaking recently of discipline of passenger brakemen we said that tidiness, civil deportment and prompt attention to duty were evidences that men's efficiency extended to all departments of their duty: and so they are as far as they go. Passengers must judge by outward appearances, and they are fully justified in believing that a man whose mind is sufficiently trained to enable him to be respectful, without being dull and sleepy, knows enough to render faithful obedience to his employer in other respects, and that one who shows an active disposition in one set of duties has in all probability trained himself to a like alertness in other departments of his work. At least those who *appear* intelligent and efficient are vastly more likely to be so, actually, than are those whose behavior gives positive indications in the opposite direction. But as the officers in charge of brakemen are not shut up to the narrow view of the passengers, we hasten to remind them that our words must not be taken by them too complacently, for it is a fact that there is a large class of men in whom politeness can be much more easily inculcated than can faithful performance of irksome duties, which, perhaps, seem to be useless. It is much easier to wait on alighting passengers (who generally require no service) than it is to carefully inspect the running gear of two or three cars, and complete the task in thirty seconds; but the latter may be the more important of a certain brakeman's duties nevertheless;

and in some respects the roads have often failed in their duty to passengers in that they have given them —the passengers—false ground for confidence by taking more pains to train the men in politeness than they do to teach them their other duties. Gentlemanly deportment is learned chiefly or wholly by observation and imitation of other people, and a man who is at all ambitious to improve himself will learn almost unconsciously. The mere presence of the superintendent on his train will serve to quicken his desire to appear well; while the correction of an erroneous notion concerning the care of the air brake, for instance, which may be lodged in his head, requires much more than the mere presence of a tutor. And where the one who should be the instructor is himself only half informed as to the subject itself or the way to teach it to others, the disadvantage is still greater.

But the brake-failure accidents have resulted not so much from brakemen's not knowing what to do as from their neglect to do at the proper time a simple duty which they do know how to perform. Couplings are left apart, valves are left closed, and there is lack of care in testing. The remedy lies in a general invigorating of the mental habit, which can be accomplished only by practice under a tutor who has the proper mental habit himself, and who knows how to discern it or its absence in others. This tutor must be the conductor. He knows, or should know, just how to handle the train at all times, and the point is to get this knowledge of his into the heads of his helpers. He, therefore, is the one to train the men to take care of the air brake, and to be vigilant in their duties as hand-brakemen. It is not easy to be faithful in waiting to perform a duty which may never be required; but the burden exists and it must be borne. A crew of brakemen need the active oversight of a conductor, even if they are of the best grade. If the conductor is one who does not know how to teach, or is of too gentle disposition to make men do things they don't like to, he is not a good man for his place. If he has to spend all his spare moments in keeping his cash and ticket accounts he should have relief in that line. On a train with a conductor and two brakemen, if one of the three must be so engrossed with money matters as to take his mind off from his duty in the physical management of the train, it would better be one of the subordinates than the captain, because human life is of more importance than is mere money profit. Companies which think they cannot afford a train collector would do well to consider whether one of the brakemen ought not to do the collecting instead of the conductor.

Brakemen cannot be taught to have intelligent and constant care over the air brakes if station gangs do all the work of making up the train and testing the brakes. If at large terminal stations the trainmen cannot attend to both the preparation of the train and the waiting upon passengers, it is a question whether the assistance would not better be given in the last-named branch of the work. It is well to have passenger trainmen dress neatly, but this may be carried too far. Their coats should not be so delicate that they will be afraid to crawl under a car. Some men, if their pay is not above the present average, will, if relieved of making up trains, be tempted to shirk necessary duties on the road because of the expense in new uniforms that will be risked. When a specially important train is to be run, a skilled mechanic is taken along as a provision against emergencies, and the brakeman is selected wholly with regard to his suitableness as an indoor train hand. In ordinary trains the endeavor is to combine these two to a certain extent; at least it ought to be; those who select all their brakemen with a view to gentility only, certainly fail of the best results. If, indeed, a road pays such low wages that good trainmen and well appearing and well behaved gentlemen cannot be secured *combined*, it is time to consider whether the pay should not be increased, to enable the train-master to get better candidates.

Every superintendent who is at all thoughtful knows the risk of putting freight men on passenger trains, and that they are more likely to make blunders on specials than on regular trains; and the fact that managers will take the risk can only be accounted for by the universal habit men have of being blind to dangers that have not been demonstrated within their own narrow horizon. The fatal St. Thomas train had some comparatively inexperienced men. Accounts of other accidents since then have mentioned a similar fact as a contributing cause. The engineman who wrecked a passenger train in New South Wales, a few weeks ago, killing seven people, was "not familiar with the line." We all talk glibly in a general way about the value of experience, but in specific cases deliberately ignore that value. A special train for the president of the road and half a dozen friends will perhaps be manned by the best men on the division, but a heavy extra, involving much more care to get through safely, and carrying half a thousand other people's friends, has to take up with freight men. There is a difficulty, of course, in maintaining a sufficient force of supernumeraries familiar with passenger service, to provide for all contingencies, but this difficulty is not always so unsurmountable as it seems. The ideal passenger train crew is that in which the conductor is fit for a superintendent and all the brakemen are fit to be conductors; and the difficulty is simply that the ideal is not sufficiently striven for. When as much pains are taken to have brakemen properly qualified before they assume their responsibilities as are taken to insure a cashier's or a ticket seller's ability to detect counterfeit money, to compute quickly and to protect the company's interest, there will be a marked advance in the actual standard.

The Doncaster Accident.

The very serious accident which occurred near Doncaster (England) on the 16th inst. is instructive in the lesson it teaches. The collision happened under somewhat peculiar circumstances. Doncaster is a busy junction on the main line of the Great Northern, a line famous even among English roads for its fast expresses. Doncaster, however, is also famous for horse racing, and the great annual St. Leger and Doncaster Cup races draw an immense concourse of excursionists from the horsey population of Yorkshire. A large number of sidings are devoted solely to the accommodation of excursion trains, which are run specially for the race week, and as, like Christmas, this festival occurs but once a year, the arrangements are necessarily of a cheap and temporary character. It has been considered that for these sidings regular interlocking and block signaling would be too expensive, and, therefore, the excursion trains are worked in the old fashioned way with flags and hand switches. The English style of compartment car does not admit of the conductor walking through the train to collect the tickets and it is a common arrangement to make a special stop for that purpose before arriving at an important station. A narrow wooden platform erected alongside the track enables the ticket collectors to walk along the train from door to door and collect and examine the tickets. A platform for this purpose used only for excursion trains to the races was erected at Hexthorpe, some two miles southwest of Doncaster. There is no regular passenger station at this place, and no fixed signals. An excursion train containing, it is said, 1,100 passengers, from Sheffield, stopped here about noon to allow tickets to be collected. The rear of the train was protected by trackmen with red flags. A regular through train from Liverpool approached the stationary train, and before speed could be materially checked telescoped the four rear cars, killing nineteen persons and seriously injuring some seventy others, four of whom have since died. The engine of the express train, which belonged to the Manchester, Sheffield & Lincolnshire Railway, lost its chimney and bumper beam, but the cars were uninjured and the passengers received only a severe shaking. The train was fitted throughout with a non-automatic vacuum brake. An examination of the train immediately after the accident showed that the brake was apparently in good order, and the only reasonable explanation of the accident is that the engineer of the through train, though a runner of 16 years' standing, forgot the special conditions prevailing during the race week, and finding the preceding fixed semaphore signal standing at safety, forgot to look out for the red flags between the semaphore and the stationary train, which belonged to the Midland Railway, which has running powers to Doncaster.

Under ordinary circumstances, an English driver keeps a smart look out to catch the earliest sight of the distant and home semaphore signals, but once he is satisfied that they indicate safety, he relaxes the vigilance of his lookout until he is approaching the next distant signal. Apparently this habit had something to do with the disaster. If the red flags were unseen or unheeded the warning would be very brief, as the through train approached round a sharp curve and the excursion train could only be seen a short distance off. It would, therefore, appear that the accident was not caused by any failure of the brakes, especially as eye-witnesses state the speed of the through train was reduced before the collision occurred.

The accident emphasizes the moral that the better and more recent semaphore system of signals should not be superseded by the old hand signals with colored flags, especially when numerous special trains introduce an additional element of danger. The desire to work the trains in quicker succession than usual no doubt prompted the suspension of the block system, which, by keeping a regular distance (generally about two miles) between the trains, renders it impossible to deal with an immense accession of traffic unless the signal cabins are placed closer together, which, of course, involves a considerable expense and levies a heavy toll upon traffic which lasts for only one week in the year. The railroad officials plead that in the hands of careful men this system of signaling by flags has worked during Doncaster races for 40 years without causing an accident of any consequence, but an unsafe system insures disaster sooner or later.

This accident not only demonstrates the inefficiency of the old method of signaling as compared with the block system, but also shows that any change should not be inaugurated without full warning to every one concerned. This lesson is especially applicable to the railroads of this country, where runners, through habit, intent on watching for flags or torpedoes, are sometimes prone to disregard the warning of the recently introduced semaphore signals.

August Accidents.

Our record of train accidents in August, given in this number, includes 65 collisions, 64 derailments and 8 other accidents; a total of 137 accidents, in which 129 persons were killed and 323 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	30	
Butting	34	
Crossing	1	
		— 65
DERAILMENTS:		
Broken rail	2	
Loose or spread of rails	5	
Defective switch	1	
Broken bridge	6	
Broken wheel	1	
Broken axle	2	
Fall of brake or brake beam	2	
Broken truck	1	
Broken draw-bar	2	
Misplaced switch	1	
Runaway train	2	
Cattle	7	
Landslide	1	
Washout	2	
Accidental obstruction	3	
Miscellaneous	4	
Unexplained	22	
		— 64
OTHER ACCIDENTS:		
Broken connecting rod	3	
Others	5	
		— 8
Total number of accidents		137

The causes of collisions where given were as follows:

Trains breaking in two	6
Misplaced switch	3
Failure to give or to observe signal	9
Mistake in giving or understanding orders	9
Failure of air brake	2
Miscellaneous	6
Unexplained	30
Total	65

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	14	..	14	10
Defects of equipment	8	9	..	17	12
Negligence in operating	27	6	8	42	30
Unforeseen obstructions	..	13	..	13	10
Unexplained	30	22	..	52	38
Total	65	64	8	138	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	27	20	4	51	26
Freight and other	96	44	4	144	74
Total	123	64	8	195	100

The casualties may be divided as follows:

KILLED:	Collisions.	Derailments.	Other.	Total.	P. c.
Employés	24	20	1	45	35
Passengers	..	78	..	78	60
Others	2	4	..	6	5
Total	26	102	1	129	100
INJURED:					
Employés	39	49	1	89	28
Passengers	47	185	..	232	72
Others	..	2	..	2	..
Total	86	236	1	323	100

Thirty-seven accidents caused the death of one or more persons and 30 caused injury, but not death, leaving 70 (51 per cent. of the whole) which caused no personal injury worthy of note.

The comparison with August, 1886, shows:

	1887.	1886.
Rear collisions	30	33
Butting "	34	13
Crossing "	1	6
Derailments	64	49
Other accidents	8	14
Employés killed	45	25
Others "	84	6
Employés injured	89	57
Others "	234	60
Pass. trains involved	51	47
Average per day:		
Accidents	4.42	3.71
Killed	4.16	1.00
Injured	10.42	3.77
Average per accident:		
Killed	0.941	0.270
Injured	2.358	1.017

Bad as was July, August exceeds it, the Chatsworth disaster swelling the number killed to almost double the July record, while the injured are nearly a fourth more numerous. Unquestionably the widespread activity in business, making traffic everywhere heavy, is fully evidenced on the dark side of the picture as well as on the bright. It is noticeable though that the passengers killed were all the victims of one wreck, that at Chatsworth. In fact, the accidents to passenger trains *on good track* are few indeed, and what there are largely the result of "negligence in operating," thus confirming the well-known fact that in track and rolling stock our best lines have reached a very high state of perfection. This should not be forgotten in considering the records of the country as a whole, which show up our deficiencies so vividly. The plain fact, though, that "negligence in operating" on the better class of roads appears apparently as often as on some of less repute should impress the lesson that improving track does not necessarily improve those who care for it, and having quick acting brakes and perfected signals does not always train the men who use them. The rear collision at Gallitzin, Pa., seems to have been caused by a block-signal man's blunder, and it sometimes seems as though carelessness in flagging and in looking out for danger signals was as common on the best roads as on the poorest.

Live Stock Movement Eastward by the Trunk Lines.

The receipts of live stock at the principal Atlantic ports, including New York, Baltimore, Philadelphia and Boston, only partially represents the grand aggregate movement. At Toledo and Detroit are yards for rest, marketing and distribution of animals in transit, as well as at Cleveland, Pittsburgh, Buffalo and Albany. The large interior towns and cities in Ohio, Pennsylvania and New York obtain supples at these points of rest and distribution. There are large sales of cattle, sheep and hogs at Buffalo to supply interior New York and interior Pennsylvania. Live stock and its products are nearly all moved by rail and make a large ratio of the total eastward rail movement.

The several large seaboard cities are ever increasing consumers of animal products. The annual export movement is upward of a half a million tons, besides the live animals exported. The movement of live animals to the principal Atlantic cities is upward of 8,000,000 head annually, and the distributed interior movement would probably augment the number to upward of 12 million or 14 million head. This may seem to be an exageration. The census of 1880 gave New York, Philadelphia, Brooklyn, Boston, Baltimore, Newark, Jersey City and Paterson an aggregate population of 3,663,545. The population of twenty large interior cities from Minneapolis to Albany and south to St. Louis was at the same date 2,592,970, or a little over a million less than at eight seaboard cities; there are other and smaller cities that will make up the difference and more. Most of the stock to supply this population must be reared where grain and forage are cheapest.

The receipts of live stock at four Atlantic cities, New York, Boston, Philadelphia and Baltimore, the first quarter of the year 1887 were 1,791,239 head, against 1,858,752 head in 1886; 1,701,674 head in 1885, and 1,730,722 head in 1884. For the second quarter of 1887, the receipts were 1,786,514 head, against 1,760,001 head, in 1886, 1,628,059 head in 1885, and 1,760,185 head in 1884. For July and August, 1887, the receipts were 1,369,613 head, against 1,352,527 in 1886, 1,301,057 head in 1885, and 1,388,662 head in 1884.

The gain in cattle, sheep and hogs received at these four ports in 1884 over 1875 was 42.2 per cent. The exports for the following years, ending June 30, have been:

	1883-4	1884-5.	1885-6.	1886-7.
Cattle, number	190,518	135.895	119 065	106,459
Hogs, "	46.382	55.025	74.187	75.383
Sheep, "	273,874	234,509	177,594	121,701
Totals	510.774	425.429	370.846	303,543

The competition in Europe causing diminished price, has checked the export movement of live animals, the decline from 1883-4 to 1886-7 being 40.5 per cent.

The exports of meats from the United States, chiefly from Atlantic ports, for the last four fiscal years, ended June 30 have been in pounds:

	1883-84.	1884-85.	1885-86.	1886-87.
Beef, canned				*43,049,388
Beef, fresh	120,784,064	115,780,830	99,423,362	83,560,814
Beef, salted	42,379,911	48,143,715	58,903,320	36,287,188
Beef, other	641,163	572,427	824,955	192,191
Tallow	63,091,103	50,431,769	40,919,951	63,278,403
Mutton	2,932,855	3,355,660	1,059,435	311,572
Bacon	341,579,410	345,930,606	369 423 040	364,416 744
Hams	47,919,958	54,201,321	50,371 785	55,504,611
Fresh pork	185,417	424,103	70,749	23,930
Salt pork	60,363,313	70,660,765	87,196,966	85,869,367
Lard	265,094,719	283,215,979	293,723,071	321,532,966
Total tons	472,486	486,354	500,959	527,013

* Not reported in previous years.

The increase from 1883-4 to 1886-7 was 11.2 per cent. The swine slaughter in the United States annually, including summer and winter packing at the important and unimportant packing points, not including the farmers' slaughter for domestic use, ranges from about 13½ millions to 15,180,000 hogs. This large product gives an immense interior distribution for domestic consumption, as well as a very large movement to Atlantic seaports for consumption and export.

There are to be great changes in the live stock trade and movement as the centre of population moves westward and manufactures increase. The centre of population in 1880 was at Cincinnati, according to the census report for that year. The annual accretion of our population, with immigration added, would make the total June 30, 1890, about 66 788,000, and in 1900 about 93,500,000. In the meantime the problem of animal food supply is of ever increasing importance.

Receipts of Flour and Grain at Atlantic Ports.

In the following table are given the receipts of flour and grain at eight Atlantic ports during July and August for five years. The ports covered are New York, Baltimore, Philadelphia, New Orleans, Portland, Boston, Montreal and Richmond.

	1887.	1886.	1885.	1884.	1883.
Flour bbls.	2,619,821	2.269.906	1,715,935	2.317,296	2,021,096
Wheat b'l	27.860,401	24 446,647	11,143,113	23.126,987	16 610,375
Corn "	5.423,120	8,173.235	10.121 356	5,161.375	13,016,900
Oats "	6,689,107	6,250,526	9,214 007	4.990.048	5,989 946
Barley "	15,406	215.873	12,980	17,609	30,942
Rye "	56.101	153.224	109,298	471.234	286,739
T'l grain	40 044.135	39,239,505	30,600,254	33,677.253	35,934,902
Flour b'l	11,789,195	10,214,577	7.721 708	10,427,832	9,094,932
T'l bushel	51,833,330	49,454,082	38,321,962	44.105,085	45,029,834
P. c. flour	22.7	20.6	20.1	23.6	20.2

The increase or decrease by percentages, as compared with former years, has been:

	1886.	1885.	1884.	1883.
Flour	15.4	52.6	13.1	30.1
Wheat	13.9	150.0	19.6	67.7
Corn	Dec, 33.6	Dec. 45.4	7.1	Dec. 58.3
Oats	7.0	Dec. 27.4	36.5	11.7
Total flour and grain	4.8	35.2	17.5	15.1

The cereal crops of the United States for four years have been:

	1887.*	1886.	1885.	1884.
Wheat, bu	430,000,000	457,218,000	357,112,000	512,763,000
Corn, bu	1,525,000,000	1,665,441,0 0	1,936,176,000	1,795,528,432
Oats, bu	675,000,000	624,134,000	629,409,000	583,628,000
Barley, bu	435,000,000	456,000,000	460,000,000	61,296,292
Rye, bu	426,000,000	427,500,000	428,000,000	26,637,594
Total bu	2,661,000,000	2,832,293,000	3,010,697,000	2,981,764,218

* Preliminary and approximate estimate. †About.

Northwestern Flour and Grain Shipments.

We have collected and tabulated below some statistics of the movement of grain and flour from primary Northwestern points for the months of July and August for four years. The first table shows the shipments by rail eastward from Chicago, Milwaukee, Duluth, St. Louis, Toledo, Detroit and Cleveland:

	1887.	1886.	1885.	1884.
Flour, bbls	1,156,804	775,322	798,381	930,844
Wheat, bush	2.599 331	1.524 338	1,802.250	2.787.213
Corn, "	2 611,856	2,285.562	4 967.970	3,814.027
Oats, "	6,068,675	8,067.396	8,557.797	7,256 020
Barley, "	355,268	355,169	73.459	144 233
Rye, "	163,176	134,071	150,939	249,601
Total grain, bush	12,398,306	12,366,536	15.552.415	15,251.094
Flour to bushels	5,205,618	3 488,949	3,592,732	4,188,798
Total bushels	17.603,924	15.855,485	19.145 147	19,439,892
Per cent. flour	29 9	22.0	18.7	21.54

These figures may be compared with the total water shipments, eastward and southward, from the same points, in the same months, by the following table:

	1887.	1886.	1885.	1884.
Total rail	17,603,924	15,855,485	19,145,147	19.439 892
" water	37.991,222	34.292.250	23,658,885	31,262,177
Aggregate	55,595,146	50,147.735	42,804.032	50,702.069
Per cent. rail	31.66	31 61	44.72	38.34
" " water	68 34	68.39	55.28	61.66
Total	100.00	100.00	100.00	100.00

The increase of July and August rail shipments over former years has been, by percentages:

	1886.	1885.	1884.
Flour	49 3	44 9	24.3
Wheat	70.5	44.2	Dec. 31 4
Corn	14.2	Dec. 47.4	Dec. 31.5

A notable fact in these figures is the progressive increase in flour shipped both by rail and by water.

Below are given the shipments, eastward and southward from the same Northwestern points, of cereals and flour by water only. They are for the same months, viz., July and August:

	1887.	1886	1885.	1884.
Flour, bbls	1,545,578	1,008,882	473 960	1,255,870
Wheat, bush	17,993,887	14.041,158	8,075 170	13.355,937
Corn, "	9,466.525	14.304.746	11,372,121	9.985 275
Oats, "	3,465.071	1,318,919	1,360,371	1.643.981
Barley, "	23,800	67.458	2,052	208
Rye, "	86,838	20.060	114,351	625,059
Total grain, bu	31.036,121	29,752,281	21,526,065	25,610,467
Flour to bush	6,955,101	4,539,969	2,132.820	5,651 710
Grand total bush	37,991,222	34.292,250	23,658,885	31,262.177
Per cent., flour	18,3	13 2	9.05	18 07

The exports of grain and flour from eight Atlantic ports during July and August, 1887, were:

	1887.	1886.	1885.	1884.	1883.
Flour bbls	1.377,496	1 306,611	587,178	924,740	820,180
Wheat bu	4,094.924	16,784 058	6,387.758	18,238,791	12,842 490
Corn "	3,294.245	5,038,245	6,088.810	3,149.895	9,358,6 3
Oats "	83,640	484,157	1,174.81"	576,796	97 730
Rye "	1 .075	108,533	86.772	483.413	1,688,682
Peas "	398,169	614,140	562,561	135,921	303,885
T'l grain	27,881,033	23,029.133	14,300.713	22,584.816	24.291.420
Flour bu.	6,189,732	5,879,750	2,642,301	4,159 530	3,690,810
G'd total	34,070.765	28,908,883	16,943,014	26,744.346	27,982 230
P. c. flour	18.	20.3	15.6	15.6	13.2

The average rate of freight by lake for the month of July from Chicago to Buffalo on wheat was $1.26 per ton of 2,000 pounds, and by canal from Buffalo to New York, it was $1 29⅛, or a total of $2.55⅛. This equals about 12¾ cents per hundred pounds, through. The regular all-rail rate is 25 cents per 100 lbs., but large amounts were doubtless carried at 15 cents or less.

The report of the German Railroad Union for the year 1885, which has recently appeared, gives statistics for nearly 40,000 miles, including substantially all those of Germany, Austria and Hungary, and some of Holland, Belgium and other states. It shows that the passenger traffic of the Union roads amounted to 7,176,340,000 passenger miles, of which only 2.8 per cent. was first-class, and 18.4 second-class, while 55.9 per cent. was third-class, 17.2 fourth-class and 5.7 per cent. soldiers, carried at less than the regular rates of the class by which they travel. The second-class is perhaps equal to the average of our first-class cars, but this leaves nearly four-fifths of the travel to accommodations such as only a very small fraction of our passengers are willing to accept. The traffic on the average was equivalent to a movement of 250 passengers over the entire system each way daily, which is much heavier than in this country. One German road (which is a short line between two considerable towns) had a traffic equal to 1,872 passengers each way daily, but next to that the heaviest travel was 960 daily, while the lightest was only 10.

The freight traffic amounted to 16,636 millions of ton-miles, which is equal to 576 tons each way daily over the entire system. No less than 88.3 per cent. of this freight went in the car-load classes, the rates on which are very much lower than on smaller quantities, so much so that small quantities are usually sent to a forwarding agent (*spediteur*), who gathers from different persons enough to make a car-load.

Some complaint having been made of the local fares on the Vermont Valley Railroad, the president, Mr. Harris, addresses to the *Springfield Republican* a letter justifying the rates charged. The road is a very short one, but the problem is rather complicated and interesting, as so many different lines and local rates are concerned. The through line from New York to Canada by this route is by the New York, New Haven & Hartford, the Connecticut River, the New London Northern, the Vermont Valley (and Sullivan, owned by the Vermont Valley), the Central Vermont, the Passumpsic, etc. President Harris gives the following average figures:

	Average train load.	Average fare, cents per mile.	Revenue per train mile	Cost per train mile.
N. N. H. & H	150	2.	$3 00	$1.17
Conn. River	100	2.5	2.50	1 20
Ver Valley	36	3 33	1.20	1.01
Sullivan	61	1.93	1.18	.99

These are the averages of through and local rates. The local fares are, on the New York, New Haven & Hartford, 2 cents; on the Connecticut River, 3 cents south of Greenfield and 3.5 cents north; on the New London Northern, 4 cents; on the Vermont Valley, 4.25 cents, and on the Sullivan, Central Vermont, etc., 3.5. The total passenger earnings on the Vermont Valley were $67,000, and the earnings from local passengers were $8,865; and the roads share in the through tickets in the ratio of their local fares. It follows then that if the Vermont Valley reduced its local fares from 4.25 cents to 3.50, or 17.6 per cent., the gain to the local public would be 17.6 per cent. of $8,865, or $1,660, while the loss to the company would be 17.6 per cent. of $67,000, or $11,692; but as shown above a reduction of passenger revenue by 17.6 per cent. would change the profit to loss. Of course in a sparsely populated country the reduction of rates cannot be followed by a profitable increase of business.

We have received from an officer of a western railroad company a narrative of a recent occurrence which deserves mention. A prairie bridge, a wooden pile trestle with three 16-ft. openings, across a dry bed 5 ft. deep, took fire. The next train due was a freight with a way car attached. The bridge was in plain view of one farm house, about a quarter of a mile away, and partly hidden from another house 1,000 ft. distant. The fire was seen by the occupants of these houses, but no effort was made to put it out, or to notify the company's employés. In fact, a man living in one of the houses stated the next day that he knew the bridge was burning, but wished to see a wreck. A passing stranger learned, at the other house, that the bridge was burning, hurried on to the next station, gave the alarm and the trains were stopped. The freight train would have reached the bridge after dark, and after the fire had been extinguished by rain, and but for the interference of the stranger, the farmers of the neighborhood would have had a real railroad wreck to talk about at the church door, and in the grocery for a year to come. It will be remembered that a favorite demonstration that the Chatsworth bridge could not have been fired for the sake of plunder was by the argument from the essential goodness of man. It was said that men so base could not exist. Nevertheless, since that event we have heard of several attempts to wreck trains, and here is a well authenticated instance of a wreck permitted, if not brought about, by simple wanton brutality. There was not even the hope of gain. Such things serve to remind us of the unceasing and minute care which railroading requires, and also to show the habitual attitude of hostility which many people assume towards the railroads. It is to the existence of this unreasoning prejudice that much unfavorable legislation may be traced, and of course it has its influence in courts of law. The part of wisdom and prudence is for the companies to seek its origin and to try the effect upon it of the Golden Rule. It is just possible that some farmer in the neighborhood of the burned bridge had been compelled to go to law to get paid for a cow killed on the unfenced track.

Some very careful and elaborate experiments on journal friction have been lately conducted by Mr. John Goodman, Stud. Inst. C. E. These experiments showed that the lubrication is most perfect and the friction at a minimum when the width of the brass subtends an angle of from 80 deg. to 110 deg. at the centre of the shaft. This has been very generally recognized, but the conclusion that the lubricating groove along the centre of the brass should run clear to the ends is not always followed in practice. The experiments showed that lubrication by means of a siphon dropping oil at intervals is a very imperfect method, especially where the pressure is constant, and the groove along the crown of the brass does not run out to the ends of the brass. The pressure on the journal forces the oil out. Pad lubrication was found to give better results, probably because the oil is used over and over again until its lubricating properties are exhausted, while with siphon lubrication the oil is often wasted before it has done sufficient work.

The scarcity of anthracite coal at Chicago seems to be real, but not so alarming as some of the reports would indicate. There is only about 40 days' stock on hand, but the carriers do not seem to be wholly to blame by any means, as coal is said to be moving westward freely via Peoria and St. Louis, and this of course goes to some of the places which Chicago dealers expect to supply. The anthracite production is large

this year, but the strike in the Lehigh Valley district the first of the season caused the diversion of a good deal of coal that would naturally have gone west. The shippers have doubtless been disposed to hold back as much as possible in the hope of getting lower lake rates. These are now firm at $1.25 per ton Buffalo to Chicago. The heavy traffic in general merchandise on the railroads has kept rail rates firm, for much of the coal has heretofore gone in west-bound empty box cars which now get many more loads out of New York than in former years, and thus deprive the coal shipping points of the privilege of "stopping off" unlimited supplies of empties. All this has encouraged the Chicago men to hold off for lower prices when they could, while still blaming the Eastern men for keeping prices up. Good judges say that there will probably be enough coal in Chicago before winter, but that it will cost something like a dollar a ton more than last year's prices.

Some weeks ago we had occasion to note the remarkable output of the North Chicago Rolling Mill Co.'s various works for their last fiscal year. The total production was 958,446 gross tons. From our technical notes this week it will be seen that the production for the month of August was 108,409 gross tons, and the statement is made that the September production will probably exceed that of August. Were the rate kept up through the year the output would exceed that of last year by over 35 per cent. The total tons of material handled by this company in its last fiscal year was nearly 2,300,000, or very nearly equal to the total freight moved by the Illinois Central in 1879, when that road operated 1,956 miles; and four months output of rails would iron the road as it was eight years ago.

At the recent Boston meeting of the Locomotive Brotherhood Lawyer E. C. Carrigan, in his speech, repeated the same old nonsense about the color-blind law, which was used so persistently in the discussions at the time of the passage of the Massachusetts law. The railroad employés of that section seem to have allowed their hostility to the law and its promoters to blind them to the true facts of the situation; and at this meeting Mr. Carrigan was introduced as one to whom the Brotherhood was especially indebted, he having been "a friend in need, and so a friend indeed." The Boston *Post* says:

"It is astonishing that men so intelligent and well trained as those who compose the Brotherhood should accept the erroneous notion that the worsted test is an unfair one. The explanation is that this delusion on their part has been fostered by politicians. Men who were catering for the 'railroad vote' made an issue out of the color-blind law, and declared that they alone stood between the engineers and a great injustice. This was the case in Connecticut. Mr. Carrigan himself cannot alter the laws of nature."

It appears that the reported action concerning demurrage charges at Omaha has not yet been consummated, though negotiations have been had, and there is some prospect of a plan being put in force. A graduated rate, and provisions against certain well-known practices which often defeat demurrage rules have been considered. It is to be hoped the officers of the roads interested will have the courage to persevere till some system is put in operation. It is high time some reform in this line should be attempted, even if it prove to be only an experiment.

In our technical notes will be found the list of topics to be considered at the coming convention of the Roadmasters' Association of America. It will be seen that at least three of the topics are of primary importance, and that two more of them are of high interest. The roadmasters certainly ought to have something valuable to say on all of the subjects, and they doubtless will. On the question of a standard joint, for instance, the roadmasters ought to give us a volume of information at first hands, and the result of personal observation and experience.

The British Board of Trade has addressed to the railroads of the United Kingdom a circular calling attention to the late outrage in a railroad carriage near Wellington, and asking for information as to the feasibility of providing for the safety of women traveling alone, by providing separate compartments on all trains and for all classes. This action of the Board is called out by inquiries in Parliament.

NEW PUBLICATIONS.

Table showing the Depreciated Values of Freight Cars at the rate of six per cent. per annum from one month until the depreciation reaches sixty per cent. of the value when new. By W. W. Barrow, Chief Motive Power Clerk, Mobile & Ohio Railroad Company (now Custodian of Records Richmond & Allegheny Railroad). Published by the Author, and for sale by the *Railroad Gazette*. Price 50 cents.

Rule 22 of the code, as adopted by the Master Car-Builders' Association, at the convention of 1887, provides that depreciation due to age shall be estimated at 6 per cent. per annum upon the yearly depreciated value of bodies and trucks, provided that allowances shall in no case exceed 60 per cent. of the value when new. The depreciated values are computed by years and months, neglecting the fractions of months, and the computations are somewhat laborious, and liable to arithmetical errors.

Mr. Barrows has computed these values for all the prices given in the Code of Rules, for each month, up to 14 years and 9 months, and they are printed in a table of four pages, each 6 in. by 11 in. From this table the value at the given age can be taken at once, by inspection, without labor or liability to error. Such a table will obviously be useful to those officers who are called upon to make up, audit, or check the accounts arising from interchange of freight cars.

Messrs. L. K. Strouse & Co., of New York City, the publishers of the Railway and Corporation Law Journal, have made arrangements for issuing an official edition of *Interstate Commerce Commission Reports*. The first numbers of necessity contain the earlier decisions, which have been long familiar to the public, but it is expected that the publication will go on so rapidly that they will soon be able to incorporate in each weekly issue all the authorized opinions and decisions of the previous week. The members of the Commission will designate the opinions to be included in the series, and will themselves perform the editorial work. The general appeprance of the work is like the official edition of the U. S. Supreme Court reports. Everything seems to indicate that the work will be thoroughly well done. Those who desire a cheaper edition will prefer the Rochester publication, noticed in our columns a few weeks ago; those who are willing to pay for having the matter in the best possible shape will unquestionably choose the series now beginning.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887, not before reported, is given as follows:

Atchison, Topeka & Santa Fe, since Jan. 1, 1887, under charter of Chicago, Kansas & Western, 337 miles; under Kansas Southern, 245 miles: Leavenworth (Northern & Southern), 45 miles; Denver & Santa Fe, 68 miles; Chicago, Santa Fe & California, 35 miles; Chicago, Santa Fe & California, of Iowa, 25 miles; total, 755 miles.

Chicago & Northwestern, Dakota Central road, from Faulkton to Gettysburgh, Dak., 43 miles.

Fargo & Southwestern, completed to Edgerly, Dak., 22 miles.

Minnesota & Northwestern, from Dunbar, Ia., 27 miles, 17 miles since last reported.

Nashville, Chattanooga & St. Louis, from Elora, Tenn., to Ferren Switch, 21 miles; from Victoria, Tenn., 10 miles; total, 31 miles.

This is a total of 868 miles heretofore unreported, making 5,779 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

	Miles.		Miles.		Miles.		Miles
1887	5,779	1883	4,281	1879	2,328	1875	861
1886	3,788	1882	7,589	1878	1,420	1874	1,125
1885	1,743	1881	5,034	1877	1,505	1873	2,867
1884	2,665	1880	3,028	1876	1,719	1872	5,066

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

Train Accidents in August.

(*Continued from page 635.*)

lision. The cars struck the engine and pushed it forward some distance to the end of the track, where it passed through a 24 in. butting post, and continued several rods into the street. The engineer was injured in jumping, and the forward brakeman, who was on the tender, had his leg broken, and was found after the engine stopped lying senseless on the floor of the cab.

UNFORESEEN OBSTRUCTIONS.

1st, on East Tennessee, Virginia & Georgia at McPherson, Ga., a slowly moving passenger train was derailed where the road bed had been weakened by a freshet.

2d, p. m., on New York Central & Hudson River near Catskill Station, N. Y., a south-bound freight derailed by the wrecking of a north-bound freight which had been thrown over so as to foul the west track; engineer hurt by jumping.

8th, a. m., on Montgomery & Florida near McLaren's Mills, Ala., freight train derailed by washout. Engineer and fireman jumped into the water and swam out.

9th, a. m., on Cincinnati, Indianapolis, St. Louis & Chicago, near McCoys, Ind., 11 cars of freight train derailed and badly wrecked by a stone on the track. A brakeman was fatally injured.

10th, on Louisville, Evansville & St. Louis near Duff Station, Ind., construction train derailed by a cow on the track, injuring 5 employés.

11th, a. m., on Pennsylvania, at Harrisburg, Pa., two cars in a switching freight derailed by a plank which one of the cars caught up from a road crossing and carried some distance until it caught in the track and threw the cars off.

11th, night, on Texas & Pacific, a passenger train ran over a cow near Dodd City, Tex., overturning engine, killing the fireman.

18th, on Wabash Railway, near Reddick, Ill., freight derailed by cattle on track.

21st, morning, on Port Huron & Northwestern, near Tyre, Mich., a passenger train ran over a cow and was derailed.

21st, p. m., on Gulf, Colorado & Santa Fe, near Valley Mills, Tex., the engine of a passenger train ran over a calf and was ditched; engineer and fireman and a man riding on the engine were badly scalded.

24th, on Canadian Pacific, near Shuswap, B. C., passenger train derailed by cattle on the track. The engine and 1 car went off and 2 trainmen were injured.

30th, on Vicksburg & Meridian, near Jackson, Miss., passenger train derailed by cattle on the track.

30th, on Missouri Pacific, near Deertield, Col., freight train derailed by a caved embankment, wrecking several cars.

UNEXPLAINED.

1st, a. m., on New York Central & Hudson River, near Croton, N. Y., engine of passenger train derailed and tipped over into a pond, injuring the fireman.

1st, p. m., on New York, Lake Erie & Western, at Goshen, N. Y., engine and six cars of a freight train derailed.

2d, p. m., on New York Central & Hudson River, near Catskill station, N. Y., a car in a north-bound freight jumped the track.

4th, p. m., on Newport News & Mississippi Valley, near Greenwood, Va., car in passenger train jumped the track and overturned, killing baggageman and injuring 8 passengers.

4th, p. m., on Missouri Pacific, near Rantoul, Kan., freight train derailed and badly wrecked; two trainmen injured.

5th, p. m., on New York & New England, in Hartford, Conn., a car in a switching freight jumped the track at a frog, derailing two cars.

6th, very early, on New York, Lake Erie & Western near Cochecton, N. Y., seven cars of a freight train derailed by one of the cars jumping the track.

8th, on Northern Central, near York, Pa., several cars of a freight train derailed and thrown over a bank. One brakeman killed.

10th, a. m., on the Savannah, Florida & Western in Jacksonville, Fla., a Jacksonville, Tampa & Key West freight train derailed whilst crossing the bridge, letting the cars partly into the stream below.

10th, on Utah & Northern, near Melrose, Mont., several cars of a freight derailed.

11th, a. m., on New York, Lake Erie & Western at Washingtonville, N. Y., freight train derailed.

11th, a. m., on New York, Lake Erie & Western, at Newburgh, N. Y., engine of a passenger train derailed.

11th, a. m., on Brunswick & Western, at Albany, Ga., sleeping car in a passenger train jumped the track on a trestle near the crossing of the Flint River. The car fell over the trestle and drew the rest of the train after it, most of the cars landing on their roofs. Two trainmen and 3 passengers seriously injured, and 10 other passengers slightly.

18th, early, on Cleveland & Pittsburgh, near Bayard, O., a Pittsburgh, Fort Wayne & Chicago passenger train, which was running over this road in order to avoid an obstruction on its own line near Alliance, was derailed while running at considerable speed on a sharp curve. One porter was killed.

18th, on Missouri Pacific, near Whitewright, Tex., construction train derailed, injuring the conductor.

19th, on Delaware & Hudson Canal Co.'s road, at Addison Junction, N. Y., 4 cars in a freight train were derailed.

20th, on Atchison, Topeka & Santa Fe, near Kansas City, Mo., an engine making a trial trip was derailed and overturned. Of the three men on the engine one was scalded to death and the others were fatally injured.

20th, on Wabash Railway, near Litchfield, Ill., 18 cars of a freight train derailed and wrecked.

23d, p. m., on Pittsburgh, Cincinnati & St. Louis, near Skelly's Station, O., the second section of an express train, composed entirely of mail and express cars, jumped the track and went over an embankment into a creek and was badly wrecked; engineer fatally scalded, 3 other trainmen more or less severely injured.

24th, very early, on Baltimore & Ohio, a passenger train derailed at Hermitage Station, Pa. The engine and 2 cars went over an embankment and were wrecked, injuring fireman slightly.

25th, night, on New York, New Haven & Hartford, near Westfield, Mass., 6 cars of a freight were derailed and damaged.

28th, on Pennsylvania, near Loyalhanna, Pa., freight train derailed on a curve.

OTHER ACCIDENTS.

1st, a. m., on Wabash Western, near Huntley, Mo., engine of a passenger train broke eccentric rod.

1st, a. m., on New York & Sea Beach, near Gravesend, L. I., connecting rod of an engine of a passenger train broke and tore a hole in the boiler.

2d, night, on Pittsburgh, Fort Wayne & Chicago, near Millbrook, O., engine of limited express broke spring banger.

4th, a. m., on Manhattan Elevated, near 92d street, New York City, connecting rod of an engine of a passenger train was broken.

9th, a. m., on Baltimore & Ohio, near Boyd's Station, Md., engine of freight disabled by the bending of an eccentric rod.

10th, on Louisville & Nashville, near Deatsville, Ala., the air drum of an engine fell on the track and pushed the grate-bars up against the arch-pipes, knocking them out and letting out a great volume of steam, which scalded the engineer fatally.

15th, on Chicago & Alton, near Marshall, Mo., the cab of a passenger engine was badly damaged by the breaking of a parallel rod, seriously injuring the fireman.

20th, early, on Cincinnati & Muskingum Valley, near Jasper, O., the engine of a pay train was disabled by the breaking of a driving-wheel.

A summary will be found on another page.

TECHNICAL.

Locomotive Building.

The Western & Atlantic has just contracted with the Rhode Island Locomotive Works for three ten-wheeled locomotives, two of which will be delivered by the 1st of January, and one by the 15th of that month.

The Car Shops.

The Ensign Car & Car-Wheel Manufacturing Co., at Huntington, W. Va., have commenced the erection of an additional building 100 × 108 ft., which will be used as an erecting shop, the present one, owing to the rapid growth of business, not being sufficiently large. At present, 11 cars are turned out complete every day, but orders are coming in so rapidly that it is necessary to increase the capacity of the works. The orders they have at present on hand will keep the concern running at its fullest capacity for a year to come.

Bridge Notes.

Riley & Goode, of Atlanta, Ga., have the contract for building substructure of bridge for the Tuskaloosa & Northern road in Alabama.

Bids are asked on an iron bridge across Middle Creek, Tremont Borough, Schuylkill County, Pa. Address Leahy, Evans & Roads, Commissioners, Pottsville, Pa.

The Decatur (Ala.) Iron Bridge Co. has already closed contracts for building eight iron bridges, one of them to cost $200,000.

The county commissioners will build a bridge across the San Antonio River at Goliad, Tex.

The city commissioners will build a bridge at Madison street, Chicago. Cost, $200,000.

The commissioners will build an iron bridge at Atlanta, Ga.

J. F. Foster, R. A. Kinloch and W. M. Bird will build a bridge at Mount Pleasant, S. C. Cost, $20,000.

The commissioners of Kingston, N. Y., will build an iron bridge.

The Louisville & Nashville will build a bridge at Greenville, Ala. J. T. Harahan, Louisville, Ky., General Manager.

The Milwaukee Bridge & Iron Works, of Milwaukee, Wis., have secured the contract for the erection of an iron bridge, 2,000 ft. long, to extend from Detroit to Belle Isle Park, which will cost $289,000.

A meeting of the directors of the Quebec Bridge Co. (Quebec to Point Levi) was held last Monday. The stock subscriptions amount to $560,000, and as a subscription of $200,000 is sufficient for the final organization under the law, the books were closed. Mr. H. J. Beamer is a very large subscriber to the stock.

Manufacturing and Business.

Carpenter Automatic Air Brake Co., of Chicago, has been incorporated; capital stock, $1,000,000. The incorporators are: Ralph E. Beebe, Wm. H. Wiswell and James P. Gardner.

The buildings of the Haskell & Barker Car Co., Michigan City, Ind., were partially destroyed by fire last week. Loss, $30,000.

The Martin Anti-fire Car-heater Co. has lately received orders from the Stonington & Boston, the Rochester & Pitts-

burgh, the Intercolonial of Canada, Vermont Central, and the Beech Creek in Pennsylvania for equipment.

Railway Supply & Lantern Co. of Chicago has been incorporated; capital stock, $25,000; object, to buy, sell and manufacture lamps, lanterns, headlights, etc.; incorporators, A. S. Osgood, C. A. Haslet, E. H. Waldron.

The Dunham Manufacturing Co. announce that the following lines have recently adopted their storm-proof freight-car door: Mobile & Ohio; Cairo Short Line; Clev., Col., Cinn. & Ind.; Fitchburg; Central Vermont; Canada Atlantic; Ogdensburgh & Lake Champlain; Providence & Worcester; Portland & Rochester; Intercolonial; Burton Stock Car; Berthold & Jennings' Cotton & Lumber Line. These adoptions are in addition to the 97 lines already using it and the 17 roads having it on trial. An error was made in this column last week in mentioning the Philadelphia & Reading in this connection.

The new shops of the Pennsylvania Iron Works, which were recently removed from Reading, Pa., to West Philadelphia, Pa., are now equipped with the Colliau Cupola Furnace, manufactured by Byram & Co., Detroit, Mich.

The Bucyrus Foundry & Manufacturing Co., of Bucyrus, O., builders of steam excavating machinery, etc., has lately made some very heavy shipments to Mexico, to the Bucyrus Construction Co., which will commence active operations there in a short time.

The Hodges Iron & Steel Construction Co., of Detroit, Mich., is said to be introducing a new method for the construction of bridges and railroad cars which has many points of merit. By their method the dead weight of bridges is materially lessened while the carrying strength is increased. In the matter of cars, they lessen the weight of the car body by 50 per cent., while they add at least 50 per cent. to the carrying capacity.

The Montana Union Railroad Company reports that the Blaine dump cars are giving entire satisfaction.

The Case Engine Co., of New Britain, Conn., has started up the first engine made since the company was organized. It is of 20 horse-power, and is set up in their own shop for running their machinery in place of the 10-horse engine made by Mr. Case in Bristol, and which has furnished power until the present time.

Nicholson & Waterman, of Providence, R. I., are building the trucks for the Bentley-Knight electric railway system adopted at Woonsocket, R. I.

The Westinghouse Electric Light Co., of Pittsburgh, and the Thomson-Houston Electric Light Co., of Boston, have arranged to consolidate, and will endeavor to cover the whole field of indoor and out of door electric lighting. All suits between the companies have been withdrawn.

The Iron Car Co., of New York, whose works are located at Huntingdon, are about to let a contract for materials to be used in the construction of 2,500 tubular iron freight cars, to carry thirty tons. There will be needed over 2,500,000 feet of oak and about the same quantity of Georgia pine lumber for the execution of the contract.

Iron and Steel.

The Novelty Iron Works, owned by Wallace Sexton, Oregon, Ill., have been destroyed by fire. Loss, $60,000.

The Pottstown, Pa., Iron Co. will erect two large blast furnaces.

The Cookson Iron Works Co. is building extensive works at Manchester, Mo. The building upon which it is at present at work is 75 × 275 ft., and other buildings will follow. The company manufactures frogs, switches, anchors, crossings, bridges, etc.

The firm of J. W. Friend & Co., Pittsburgh, Pa., will resume work in their sheet and steel mills in the West End, after an idleness of five years duration. The preparations for resuming work are rapidly going on, and it is expected that within a month the mill will be running.

The old nail mill of the Clinton Iron Works, of Graft, Bennett & Co., at Pittsburgh, Pa., is being turned into a steel works. Two open hearth furnaces are being built, and a train of rolls are being erected. The firm expect to have the furnaces ready to operate by the middle of October.

There was recently cast at the foundry connected with the large works of J. P. Witherow, at New Castle, Pa., a bed-plate which, when dressed, will weigh about 16,000 pounds. The engine for which the bed-plate is intended will go to the blast furnaces of the Dayton Coal & Iron Co., at Dayton, Tenn., which were built some years ago by Mr. Witherow.

Falling Spring Furnace (charcoal), at Chambersburg, Franklin County, Pa., is offered for sale. It is a modern stack, 8½ × 40 ft., and was remodeled in 1883-84. It can use either hot or cold blast.

The Rail Market.

Steel Rails.—Market is very dull. There have been no important sales reported, though there are rumors that some important transactions have been consummated. Quotations: $36@$37 at Eastern mill, according to time of delivery, for standard sections.

Old Rails.—A sale reported of a 1,000 ton lot of tees, $22.50; also a lot of 600 at that price, and 300 tons delivered to lighter at $22, and 400 tons on cars at Jersey City. Quotations: Tees, $22.50@$23, and double-heads, $23.50.

Scrap.—Market is dull. Quotations: $21@$22 for yard scrap.

The North Chicago Rolling Mill Co.

The August output of the works of this company amounted to 108,409 gross tons, as follows:

Pig iron	34,946
Steel ingots	35,390
Steel rails	30,169
Splice bars	1,863
Merchant sizes, iron and steel	6,041
Total	108,409

The material used and ore unloaded at the docks amounted to 227,335 tons. One month's output of rails would lay 343 miles, of 56 pounds to the yard, or at the rate over 4,000 miles per annum. The gross sum of material handled, the consumption and production together, amounts to 22,383 car loads of 15 tons, or something like 140 miles of continuous trains. The September product is expected to equal that of August, or perhaps exceed it.

A State Commission on the Upper Berth Lock.

The Minnesota Railroad Commission has addressed a letter on the upper berth question to General Manager Roswell Miller, of the Chicago, Milwaukee & St. Paul. The Commissioners say that they know of nothing better than the arrangements now in use on the Pullman cars; but that if the spring lock is longer to be tolerated there should be an appliance coupled with it by which, on opening the berth for use, the spring can be set or fastened back in a manner to prevent its play or movement. Until the spring be entirely removed or its capacity for mischief effectually destroyed, the commission must refuse the responsibility of approving any or all appliances.

Accident in New South Wales.

The particulars of the Peats Ferry railway accident in New South Wales have come to hand. An excursion train descending a long 132-ft. grade got beyond the control of the engineer and ran into some cars standing at the foot of the grade. The engineer and several others were killed and the engine flung into the river. The Westinghouse automatic brake was fitted to 5 of the 9 cars of which the train was composed, but was cut out on one car. After the collision the tires and brake shoes on the rear two of these cars were found to be cold, and the tap on the train pipe between the two vehicles next the tender was closed. The coroner's jury, by their verdict, virtually censured the management of the railroad, and considered that the brake had not been properly inspected or coupled up. The board of inquiry appointed by the government appeared to consider that the tap was closed by the collision (which telescoped these two first cars), and that the driver had exhausted the air in the reservoirs by injudiciously applying and releasing the brakes too frequently. A writer to one of the colonial papers contends that the brake leaked off owing to the piston leathers being in bad order, but the railroad authorities deny this and state that they had been recently examined and found in good order, and that the use of the brake on the day of the accident showed that it did not leak off. The management of the railroads apart from any question as to the brake appears to have been lax.

Roadmasters' Association of America.

As announced last week this Association will meet in Cleveland, the 11th inst., for a session of three days. The subjects for consideration are standard guard rail for frogs, standard frogs, standard guard rail for bridges and rerailing safety frogs at bridges, standard track joints, stand-ard rail, standard hand cars.

Light Traffic Trains in France.

The Northern of France and the Paris, Lyons & Eastern railroads are now running trains composed of a light locomotive and one car large enough to hold 72 passengers of the three classes, viz., 8 first class, 16 second class and 48 third class.

These trains stop at all cross roads and are run at nearly the speed of the accommodation trains, which stop only at stations, as with only one car they can gain speed very quickly.

Short Time in the Crewe Shops.

The London & Northwestern has posted notices in its locomotive shops announcing that the time will be shortened 7½ hours per week. This will affect between 6,000 and 7,000 men. The *Railway News* states that full time was only resumed last March, the men having been on short time for the preceding eighteen months.

The Homogeneity of Cast Steel Ingots.

A large part of the address of Mr. Daniel Adamson, the President of the British Iron and Steel Institute at the Manchester meeting of the Institute was devoted to the causes of the dissociation of the various elements in large steel castings and the methods of securing homogeneousness.

The specific gravity, specific heat and melting points of the various compound elements of steel are given as follows:

	Specific gravity.	Specific heat.	Melting point.
Cast iron	7.5	.1298	2000°F.
Cast steel	7.85	.1165	2400°F.
Wrought iron	7.54	.1098	2820°F.
Manganese	8.00	.1441*	.....
Sulphur	2.00	.1884	2390°F.
Phosphorus	1.77	.1887	112°F.
Carbon (graphite)	2.20	.....	.....
Chromium	6.00	.....	.....

* Highly carbureted.

Manganese melts at the highest heat of the forge, while chromium does not melt but softens.

Mr. Adamson holds that a great deal of the difficulty is due the differences pointed out in the gravity, specific heat and melting points, and that the safest way to prevent the light alloys from rising to the top of the ingot, or gathering at the centre by dissociation when cooling, is by determining that neither sulphur, phosphorus nor silicon shall be present except in very minute proportions; this leaves only carbon as a disturbing and necessary element, which requires "the manufacturers' most careful consideration." Manganese, on the contrary, which has both its specific gravity and specific heat so near that of iron, may be increased considerably without much risk of irregularity.

This careful testing of ingots left to cool without mechanical interference shows that carbon and the other alloys, excepting manganese, are found invariably more in the top of the ingot than in the bottom, and more in the centre than towards the outside. This is recognized in the requirement of the French government that 28 per cent. of the top and 4 per cent. of the bottom of the ingot shall be cut off before forging, and the central metal of unequal quality removed. In the Royal gun factory at Woolwich, it is not thought necessary to remove the 4 per cent. from the bottom.

Mr. Adamson, who objects to the violence of the percussive force of the steam hammer for steel, preferring the quiet concentrated force of the forging press, has no tangible evidence to offer us as to whether the same tendency to dissociation is found where mechanical consolidation is adopted, as in the Whitworth system of consolidation, but strongly suspects that the same law of irregularity will be developed, though most probably in a less degree, as the evil of mechanical contraction is entirely superseded by the overpowering force of compression. The necessity for thorough annealing is strongly urged.

Canadian Canal Contracts.

The Department of Railways and Canals of Canada is advertising for bids for certain new locks, and contractors are looking over the ground. E. H. Parent, Superintending Engineer, Montreal.

Boston Society of Civil Engineers.

A regular meeting of this society was held Sept. 21. Messrs. Lucien A. Taylor and Erastus Worthington, Jr., were elected members. Prof. Chaplin presented an address of the Board of Managers, asking for the appointment of delegates to a convention of engineering societies, and moved that the President be authorized to appoint delegates to attend the convention whenever it should be called by the Board of Managers. The address was referred to the Government to report at the next meeting.

Mr. Frank W. Hodgden read a paper on the methods used in filling a portion of South Boston flats. Mr. C. W. Folsom exhibited a plan showing the location of a washout which occurred on the Boston & Lowell near Arlington, Mass.

Importations of Iron this Year.

The Bulletin of the American Iron and Steel Association says: "The total imports for the seven months of the year have amounted to 1,102,700 tons. This was a larger importation than took place in the whole year of 1886. The figures for that year were 1,098,565 tons. There was a considerable decline in the aggregate imports of iron and steel for July, as compared with May and June. This shrinkage was most marked in pig iron, scrap iron and wire rods. The imports of iron ore in the first seven months of 1887 amounted to 684,562 tons. The exports of iron and steel from Great Britain to the United States in August were fully up to the large exportations in each of the two preceding months, the figures for August being 118,018 tons, against 117,139 tons for July and 118,639 tons for June. The exports to the United States in the first eight months of the year amounted to 921,665 tons. The figures given by us of the imports from all countries of iron and steel in July would encourage the hope that these imports will now decline from month to month, but the statistics of our imports from Great Britain in August largely dispel this hope."

Civil Engineers' Club of Cleveland.

Regular monthly meetings of this club were held Aug. 9 and Sept. 13. Mr. G. R. Hardy, Chief Engineer of the Lake Shore, was elected a member of the club, and the resignation of Mr. W. M. Wood was accepted. Mr. J. H. Sergeant read a history of railroads between Cleveland and Chicago, and Mr. H. C. Thompson a paper on a method of building a second track for single-track railroads. Mr. John Walker gave a brief description, with illustration, of a new method of heating and ventilating workshops as adopted by the Walker Manufacturing Co.'s works in Cleveland. Mr. Julius Roemmele explained his method of using his patent key way gauges.

A Ship Canal Convention.

It is proposed to hold a convention at Peoria, Ill., Oct. 11, to promote the work of connecting the lakes with the Mississippi by a ship canal. The Mayor of Chicago has appointed a committee of 40 to represent that city.

The Emerson Car Heater.

It is reported from Springfield, Mass., that Mr. G. A. Houston, of the Atchison, Topeka & Santa Fe Railroad, has reported to his company favorably of the Emeson car heating system, that his report has been accepted, and that Mr. Emerson has been authorized to equip its cars. Mr. Houston reports that in his tests of the system in a four-car train on the Connecticut River Railroad "on a cold March day" the average steam condensation was equal to about one-fifth of a horse-power per car in 12 hours; and he estimates that on the Atchison road, with the changes which he proposes, the cars "which are largely used in mild climates and in long runs will require as a maximum very rarely more than one-half horse-power per car; and, as a minimum, but little more than the surplus steam of the engine."

Steel Ties.

The statement is made that one steel works in Wales is now executing an order for 280,000 steel ties for the East Indian State railroads.

Trial of a Sprague Motor.

The Sprague Electric Railway & Motor Company lately exhibited its new electric car, built for the West End Street Railway, of Boston, to a small party of invited guests. There are two motors of seven and one-half horse-power each, placed under the floor. The power is supplied by a storage battery of 120 cells placed under the seats. The battery will run the car for about four hours without recharging and the speed may be made to reach 15 miles an hour, or even more. The whole is controlled by a lever on the front platform.

THE SCRAP HEAP.

President and Mrs. Cleveland's Car.

The car in which President Cleveland and his handsome wife are to travel around the country during the next month is George M. Pullman's private car. It is now being fitted with a new system of electric lighting, and also partly refurnished. It has every possible convenience, from a piano and library to a cook stove. It also has a history, for it has carried nearly every great man, native or foreign, who has made an extended tour of the country in a dozen years. Gen. Grant came east from San Francisco in it, and he used it with his family on several other journeys. It carried the late President Arthur when he made his memorable trip to Florida, and the Duke of Sutherland journeyed in it across the continent. Mr. Pullman is rather proud of the car on account of these associations, and he has no present thought of parting with it. "The newspapers are always building new cars for me at fabulous prices, and furnished with all the splendors of an Oriental palace," said Mr. Pullman yesterday afternoon, "but I am going to stick by the old love. I suppose the reporters will be mad, but I can't help it."—*N. Y. Sun.*

The Doncaster Accident.

The coroner's jury in the case on the collision on the Midland Railway, near Doncaster, Eng., on Sept. 16, has rendered a verdict of manslaughter against both Taylor, the engine driver, and the fireman of the Liverpool Express. It was asserted on the part of the express that no danger signals were up, but the jury found otherwise.

Railroads in Japan.

Consul Jernigan, at Osaka and Hiogo, Japan, in a report to the Secretary of State upon railroads and railroad regulations in Japan, states that 34 new railroad projects have been started within the last six months, 21 of which involve an aggregate capital of $48,000,000. The existing roads have all been surveyed and constructed by foreigners, but the list contains the names of no Americans, no do American mechanics or engineers appear to have any connection with the new projects.

A Mexican Railroad.

A Deming (New Mexico) newspaper announces the arrival in that town of two Englishmen, Mr. Weber and Mr. Kerr, the agents of English capitalists who have purchased land and franchises for a railroad southward from the Mexican line to a point in Sinaloa. The route given is from a point on the boundary directly south of Deming, through the states of Chihuahua, Sonora and Sinaloa to an intersection with the Sinaloa & Durango, 600 miles in all, and the road is to be narrow gauge, with "iron ties, steel rails and first-class English equipment throughout." The geography of the project is very obscure. The line along the Eastern foothills of the Sierra Madre would pass through a fine timber country. On the whole, the narrow-gauge, iron-tie and first-class English equipment specifications give the story an air of improbability.

Railroad Land Grant Adjustments.

The Commissioner of the General Land Office has completed the adjustment of nine railroad grants out of the whole number of such grants pending for adjustment, three of which have been reported to the Secretary of the Interior, and the remainder are being prepared for transmittal. The land office adjustment in these cases shows that the St. Joseph & Denver City has received 22,276.22 acres of land in Nebraska outside of railroad limits, and that the company would be entitled to 143,959.91 acres more than received if there were lands within limits subject to selection. It is understood that nearly all the lands have been exhausted, and, therefore, that this grant is practically closed. In the other eight cases the adjustment shows that an aggregate of 1,253,485 acres have been erroneously patented or certified in excess of the amounts due under the grants, and that the same companies have filed lists of selections aggregating 1,644,384 acres in addition, making a total of 2,897,864 acres received and claimed in excess of the grants. Commissioner Sparks will hold the excess selections for rejection and cancellation, and recommend suit in the courts to set

aside the excess patents and certificates. The adjustment of the remaining railroad and wagon-road grants is in progress, and an increased office force to do this work will be detailed by the commissioner.

A Porteress.

A porteress seems to be the latest addition to the luxuries of modern railroad travel. An excursion from Boston to Richmond, Va., the Natural Bridge and intermediate points, advertised by the Pennsylvania Railroad, having among its announcements the assurance to ladies traveling alone that a matron will accompany the party to look especially after their wants.

The Hue of Tickets.

A new system of engraved tickets has been introduced on the New York, New Haven & Hartford and each division of the road has an especial color. Tickets to stations on the New York division are blue; Hartford division, green; Shore Line division, brown; Air Line division, orange: Northampton division, red; Valley division, buff; Naugatuck division, gray. Conductors who are not color blind will thus be aided in quickly learning the destination of a ticket.

Squelched Enterprise.

A man at Belvidere, Ill., placed a rock on a railroad track and then flagged a train that was rushing upon the obstacle. In return for his services he asked the railroad company to give him a position. The company did so; he now has a position in the penitentiary. This beautiful tale of heroism and gratitude probably will never find its way into the story-books for children.—*Exchange.*

Various Notes.

No train robbery in Texas this week.

The new Harlem River bridge at 181st street, New York, has made good progress during the summer, and will be completed next June.

President Chauncey M. Depew arrived home from Europe this week, and is said to have brought along a fine fund of fresh funny stories.

The annual inspection of the New York Central & Hudson River road will take place next week.

Orders have been received in the shops of the New York, Pennsylvania & Ohio and the New York, Lake Erie & Western, to convert the diamond stacks of all passenger locomotion, and to build extension fronts to the locomotives.

Attempted Train Wrecking.

The engineer of the St. Louis express on the Fitchburg road sighted an obstruction on the track in front of his train at 8:30 oclock on Sept. 25, and just barely succeeded in averting a terrible accident. It was one mile west of North Pownal, Vt. Nine sleepers had been piled on the track and before the train could be brought to a standstill the engine struck them with considerable force, but no damage was done. There have been several attempts to wreck Fitchburg trains by tampering with the switches near Pownal, but they have always been unsuccessful, so this new method has been adopted, probably by the same parties.

RAILROAD LAW—NOTES OF DECISIONS.

Injuries to Passengers, Employes and Strangers.

In Alabama, the Supreme Court rules that the law devolves on railroad companies the obligation, not only to properly construct and keep in safe condition their ticket office, and the platforms and approaches thereto, but also to provide sufficient and suitable light when the trains arrive and depart in the night time.[1] In Mississippi, a passenger on a train left his seat as the train approached his station, with a view of getting off, and went to the rear platform, whereupon the conductor, looking into the car, failed to see him, and, supposing that he had got off, omitted to call the name of the station, and ordered the train, which had not stopped, to move on, whereby the passenger was compelled to alight some five or six hundred yards beyond his station, and in consequence incurred injuries from which he died. The Supreme Court holds the company liable in damages.[2] In Louisiana, the Supreme Court rules that a railroad company is responsible for injuries received by a passenger seeking to board one of its trains at night, who finds no one to inform him how to reach the sleeping car attached to the train, which is left standing outside of the yard, and to which a sidewalk, erected by the company under a contract with the city, leads in a direct route, which the passenger follows, and from which he falls by reason of defective or insufficient lights at that part of the station approach.[3]

In Minnesota, one Grimes and wife conveyed to a railroad certain land for the purposes of its road, and in consideration thereof the railroad agreed to carry them and their children free of charge on its passenger cars. One of the children subsequently went on a train and was ejected for non-payment of fare. The Supreme Court holds that he is entitled to damages, saying: The fact that his *father* had purchased and paid for this right of free carriage is of no importance. The plaintiff's right is as complete as if he had purchased and paid for it himself; and, as a logical consequence, its infringement, whether tortious or otherwise, is a wrong to him for which he has his action. The contract was not that plaintiff should be furnished with a pass upon application, but that he should be "carried free of charge." As a reasonable regulation of its business for the purpose of preventing imposition, the defendant might very properly have provided plaintiff with a pass, and required him to exhibit it to conductors. But plaintiff was under no obligation to apply for one; and, if none was furnished him, he had the right to be carried without one. If the defendant, as appears in this case, made it a rule to issue no passes, then it was its duty to inform the conductors of plaintiff's rights, and instruct them to allow them.[4]

In North Carolina a brakeman, after cutting an engine loose from the train, and changing a switch, attempted to mount the pilot of the engine while it was in motion. His trousers became entangled in iron splinters projecting from a frayed rail. He fell, and his hand was crushed by a wheel. There was evidence tending to show that he had received from the conductor general directions to ride on the engine, but it did not appear that a special direction to this effect had been given at this time and place. The Sureme Court, on the ground of the plaintiff's contributory negligence, reverses a judgment for damages against the railroad.[5]

In Missouri in an action against a railroad company to recover for the death of a fireman, caused by the track giving way under the train during a heavy rain, the Supreme Court of Missouri holds that the sudden giving way of the track was *prima facie* evidence of negligence in its construction, and that the evidence as to whether the rain was an extraordinary one being conflicting, the case was properly sent to the jury. In such action the fact that the fireman and engineer were warned against danger from water in the neighborhood of the place where the accident occurred, it appearing, however, that a long train passed safely over the track shortly before their train was *held* to be, at most, only evidence of contributory negligence for the consideration of the jury.[6]

In Kentucky, the Court of Appeals holds that where, in obedience to the order of the conductor in charge of a freight train about to start, the foreman of the car-repairers goes under it to fix a defective brake, and is run over by the backing of the train while he is known by the conductor to be there, the railroad company, the common employer of both, is liable.[7]

In Arkansas the obligation of a railroad company toward trespassers on its tracks is stated by the Supreme Court thus: A railway company having a legal right to a clear track, except at crossings, owes no duty to a trespasser walking on the track from one station to another until his presence is discovered, and even then those in charge of an approaching train may assume that he will get off the track to avoid a collision, unless they can see from his condition, or the circumstances surrounding him, that he cannot get out of danger. The liability of a railroad company to a trespasser on its track must be measured by the conduct of its employés after they become aware of his presence there, and not by their negligence in failing to discover him; for, as to such negligence, the contributory negligence of the trespasser will defeat a recovery.[8]

In Alabama a woman was injured on a side track of a railroad, near a public crossing, in the limits of an incorporated town, by being caught between two cars, one of which was set in motion by a backing engine and cars, moving at the rate of about one mile per hour, engaged in coupling cars. She was standing in a space of four feet between the two cars, talking to a person in one of the cars, when the injury occurred. The Supreme Court holds that the railroad company is not liable in damages, as it is not bound to protect trespassers.[9] In Mississippi, it is laid down by the Supreme Court of the state that a person who gets on a railroad track where he has no right to be, some 60 ft. in front of an advancing train, and walks toward it, there being nothing to obscure his view, and is run over, is guilty of such contributory negligence as will prevent a recovery for his death; and this, though it be proved that the train was running at a greater speed than allowed by law, and that defendant's engineer did not see him, though he might have done so.[10] In New Hampshire a number of boys went on the company's premises in the evening and set the turn-table in motion. While thus playing one of the youngest of the boys, seven years old, was injured. The Supreme Court rules that the railroad company was not responsible, placing its judgment on the broad ground that a land owner is under no duty toward a trespasser to keep his premises safe. The principle is thus stated: "One having in his possession agricultural or mechanical tools is not responsible for injuries caused to trespassers by careless handling; nor is the owner of a fruit tree bound to cut it down or inclose it, or to exercise care in securing the staple and lock with which his ladder is fastened for the protection of trespassing boys who may be attracted by the fruit. Neither is the owner nor occupant of premises upon which there is a natural or artificial pond, or a blueberry pasture, legally required to exercise care in securing his gates and bars to guard against accidents to straying and trespassing children. The owner is under no duty to a mere trespasser to keep his premises safe, and the fact that the trespasser is an infant cannot have the effect to raise a duty where none otherwise exists."[11]

The above cases illustrate the principle that as to trespassers railroads are not obliged to take precautions in advance. A recent Louisiana case shows, however, that the trespasser being discovered is entitled to legal treatment and care. A boy of eleven, on his way home from school, was attracted to an excursion train by the playing of a band on the train, and went to and entered one of the cars where the band was playing. No objection was made, at the time, to his going into the car. Some other boys were on the car with him. The train moved off to reach a point where a crowd of passengers were waiting to get aboard. While the train was thus moving, a man having a lantern in one hand and a stick in the other, came through the car, and ordered this boy and the other boys to get off, hurrying them, and, as some of the witnesses say, striking at them with the stick in his hand. At any rate, in the effort to get off while the train was running, the boy fell between the cars and was injured so that he afterward died from the effect of such injury. The Supreme Court holds the railroad responsible in damages.[12] In Michigan, a girl eleven years of age, while on her way to school along the main street of the village, was compelled to stop at the railroad crossing by three freight trains standing across the thoroughfare. There were three tracks at the point, viz., two side tracks next to the child, and a main track further to the north. Two of the trains furthest from her then began switching, the one nearest to her standing still. That train then drew out, and the child passed over the first track and the second, which were clear, and was stopped at the main track by another of the trains which was running west. That passed, and she then stepped upon the main track, and stood between the rails, looking at the train which had gone west, when the third train, backing down from the east on the same track, ran the caboose over her and killed her. This train was made up of engine and tender, two box cars and a caboose. There was no watchman at the rear end, and no flagman at the crossing, and the train was backing about as fast as a person walks. The bells of all three engines were ringing when the accident occurred. The Supreme Court holds that the girl was not a trespasser, nor, considering her age and sex, was she guilty of negligence.[13]

[1] Alabama S. S. R. Co. v. Arnold, 2 South Rep., 337.
[2] Louisville, N. O. & T. R. Co. v. Mask, 2 South. Rep., 360.
[3] Moses v. Louisville, N. O. & T. R. Co., 2 South. Rep., 567.
[4] Grimes v. Minn., L. & M. R. Co., 33 N. W. Rep., 33.
[5] Cornwall v. Charlotte C. & A. R. Co., 2 S. E. Rep., 659.
[6] Stoner v. St. L., I. M. & S. Ry., 4 S. W. Rep., 389.
[7] Reitt v. Louisville & N. R. Co., 4 S. W. Rep., 796
[8] St. L., I. M. & S. R. Co., v. Monday, 4 S. W. Rep., 782.
[9] East Tenn., V. & G. R. Co. v. King, 2 South Rep., 152.
[10] Mobile & O. R. Co. v. Stroud, 2 South Rep., 171.
[11] Frost v. Eastern R. Co., 4 New Eng. Rep., 527.
[12] Vicksburg & M. R. Co. v. Phillips, 2 South. Rep., 537.
[13] Cooper v. Lake Shore & M. S. R. Co., 33 N. W. Rep., 307.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago & Eastern Illinois, annual meeting, at the office, Chicago, Ill., Oct. 4.

Eastern Illinois & Indiana State Line, special meeting, at the office, Chicago, Ill., Oct. 31.

Louisville & Nashville, annual meeting, at the office, Louisville, Ky., Oct. 15.

Minneapolis & St. Louis, annual meeting, at Minneapolis, Minn., Oct. 4.

Momence & State Line, special meeting, at the office, Chicago, Ill., Oct 31.

Ohio & Mississippi, annual meeting, at the office, Cincinnati, O., Oct. 13.

Lake Erie & Western, annual meeting, at the office, Bloomington, Ill., Oct. 5.

Cumberland Valley, at the office, Harrisburgh, Pa., Oct. 3.

Housatonic, special meeting, at the office, Bridgeport, Conn., Oct. 5.

Carthage & Adirondack, at the office, 12 Broadway, New York, Oct. 17.

Evansville & Terre Haute, annual meeting, at the office, Evansville, Ind., Oct. 17.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Time Convention, Hotel Brunswick, New York City, Oct. 12.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

North American Railroad Superintendents, at the Hotel Brunswick, New York, beginning Oct. 10.

The *Brotherhood of Railway Brakemen*, National convention, at Binghamton, N. Y., beginning Oct. 19.

The *Brotherhood of Locomotive Engineers*, annual meeting, Central Music Hall, Chicago, Oct. 19.

The *Association of Railway Section Foremen*, annual meeting, Council Bluffs, Ia., Oct. 5.

The *Roadmasters' Association of America*, fifth annual Convention, Kennard House, Cleveland, O., Oct. 11.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, quarterly, 1¾ per cent., payable Nov. 1.

Evansville & Terre Haute, quarterly, 1½ per cent., payable Oct. 17.

New York & New England, 3½ per cent. on preferred stock, payable Nov. 1.

Sunbury & Lewiston, semi-annual, 3 per cent., payable Oct. 1.

PERSONAL.

—Joseph Patterson, the oldest bank president in Philadelphia, and a director of the Lehigh Valley road, died on Sept. 25, at the age of 84 years.

—Amos T. Bennett, who has been chief carpenter of the Chicago, Milwaukee & St. Paul for the last 20 years, died at Watertown, Wis., on Sept. 18, aged 67.

—Col. Amos E. Kapp, one of the projectors and builders of the Northern Central, from Sunbury, Pa., to Baltimore, Md., died on Sept. 22, at his home, near Northumberland, Pa. He was 73 years of age, and had lived in Northumberland for 50 years.

—G. W. F. Sherwin, a civil engineer, died at Erie, Pa., on Sept. 24. In 1846 he made the survey of the Northern Missouri Railroad, and was, later, engineer, and then assistant superintendent and paymaster of the Chicago & Alton. He laid out the towns of Sioux City and Niobrara, Neb.

ELECTIONS AND APPOINTMENTS.

Alabama Great Northwestern.—The incorporators are: E. B. Joseph, W. F. Joseph, J. W. Woolfolk, P. Chauncey Smith and W. G. Hutcheson, of Montgomery, Ala.; R. P. Tallman, of Greenville, Ga.; and Jas. S. Hegley, of New York City.

Boston & Albany.—Samuel Hoar, of Concord, Mass., has been made a director and counsel in place of the late Judge A. L. Soule. Chauncey M. Depew was some time ago chosen a director in place of George O. Crocker, deceased.

Chicago, Burlington & Kansas City.—W. E. Cunningham has been made Assistant Superintendent of this road and the St. Louis, Keokuk & Northwestern. M. A. Baker has been appointed Superintendent of Telegraph.

Chicago, St. Louis & Pittsburgh.—John E. Loomis has been appointed local Freight Agent at Chicago, vice E. E. Loomis, resigned.

Cincinnati, Indianapolis, St. Louis & Chicago.—W. M. Greene has been appointed Assistant to President Ingalls, with headquarters at Cincinnati. He recently resigned the vice-presidency of the Columbus, Hocking Valley & Toledo.

Cincinnati, Richmond & Chicago.—The following officers have been elected: President, T. D. Messler, Pittsburgh; Treasurer, John G. Davidson, Pittsburgh; Secretary, S. B. Leggett.

Georgia, Midland & Texas.—C. W. Chears has been appointed General Freight and Passenger Agent, with headquarters at Columbus, Ga.

Kanawha & Ohio.—Nelson Robinson has been elected President, vice Erwin Davis, resigned.

Kansas City, Memphis & Birmingham.—O. H. Crittenden, formerly engineer in charge of tracklaying on the Eastern Division, has been appointed Roadmaster of the Middle Division, Tupelo, Miss., to New River, Ala.

Kansas, Missouri, Arkansas & Natchez.—The following officers have been elected: Colonel J. L. Tilley, President; M. W. Clay, of Neosho, Mo., Vice-President; J. H. Carroll, of Fort Smith, Secretary; J. P. McIlhaney, of Neosho, Mo., Treasurer; Talbott Stillman, of Fort Smith, Ark., Attorney.

Knoxville Belt Line.—The incorporators of this Tennessee company are George R. Eager, A. C. Arthur, Clarence Carey and others.

Lake Erie & Western.—P. Reilly has been appointed Superintendent of Equipment, with office at Lima, O., vice H. L. Cooper, resigned.

Lake Shore & Michigan Southern.—W. S. Brown has been appointed Traveling Passenger Agent, vice George C. Wantes, transferred. His headquarters will be at Toledo, O., and his territory includes lines west of Cleveland and east, north and south of Elkhart.

Louisville, New Orleans & Texas.—P. R. Rogers has been appointed Assistant General Passenger Agent, and R. B. Maury, Jr., General Traveling Passenger Agent, headquarters at Memphis.

Paducah, Chickasaw & Birmingham.—The incorporators of this Alabama company are: James Jackson, J. B. Moore, G. T. McWhorton, John B. Steadham, W. A. Johnston, W. R. Alexander and S. Marshall.

Rich Hill Dummy Line.—The following have been elected officers of this Missouri company: P. E. Emery, President; Joseph M. McGibben, Vice-President; John A. Payne, General Manager; Robert C. Marsie, Secretary and Treasurer. Estimates will be received for furnishing the materials for the road.

St. Louis, Vandalia & Terre Haute.—C. C. Curtice has been appointed Southwestern Passenger Agent, with office in

Dallas, Tex., vice T. H. Thorpe, transferred to Des Moines, Ia.

San Diego & Cuyamaca.—The directors of this new California company are: R. W. Waterman, of San Bernardino, and T. J. Daly, Q. Allison, M. G. Reffenberg, Milton Santee, I. M. Merrill, M. Klauber, all of San Diego.

Union Pacific.—C. F. Ressiguie has been appointed Superintendent of the Idaho Division. He was Superintendent of the Illinois lines of the Chicago, Burlington & Quincy. Hoyt Sherman has been appointed Assistant General Passenger Agent, with headquarters at Salt Lake, Utah.

Western and Northwestern Freight Bureaus.—A. B. Leet has been appointed Assistant to Chairman Faithorn.

Winona & Southwestern.—E. S. Youmans is President; H. W. Lamberton, Vice-President; M. G. Norton, Treasurer; Thomas Simpson, Secretary. These, with R. D. Cone, Charles Horton, John Mathews, John Robson, Andrew Hamilton and ex-Lieut. Gov. Gale constitute the Board of Directors. They all live in Winona, Minn.

Wisconsin Central.—The following appointments have been announced: C. F. Waldo to be Superintendent of the Wisconsin Central, Portage to Chelsea, and the Wisconsin & Abbottsford, Abbottsford to Chippewa Falls. H. A. Barnes having tendered his resignation, John Player has been appointed Superintenant of Motive Power, with headquarters at Waukesha, Wis. P. Walling has been appointed Superintendent of Bridges and Buildings for the Wisconsin Central associated lines, with headquarters at Stevens Point, Wis. Mr. Thomas C. Clifford to be Acting Superintendent of the Minnesota, St. Croix & Wisconsin and the Chippewa Falls & Western in place of C. F. Waldo, transferred.

OLD AND NEW ROADS

Alabama Great Northwestern.—Articles of incorporation have been filed in Alabama. The proposed road is to be built from Montgomery northwestward to the state line between Alabama and Mississippi, passing through Montgomery, Autauga, Chilton, Bibb, Shelby, Tuskaloosa, Jefferson, Walker, Fayette, Lamar, Pickens and Marion. The road will be virtually a continuation of the Alabama Midland, which is to be built from southeast Alabama to Montgomery. Principal office of the new company is at Montgomery.

Arkansas & Grand Prairie.—It is stated that the road projected from Beebe, Ark., to Morgan City, La., will be built at an early day. G. M. Barbour, of Chicago, is President.

Atchison, Lawrence & Southern.—Atchison, Kan. has subscribed money to complete the survey of this road through Atchison County, and the county commissioners have called an election on the proposition of issuing $30,000 bonds for the road.

Austin & Northwestern.—This road, which now terminates at Burnett, Tex., will be extended to Llano, 33 miles west. Surveys have been made and right of way secured. Road will be completed by next January.

Camden & Montgomery.—A survey is to be made for this proposed road. It is intended to run from Camden, Wilcox County, Ala., to Montgomery.

Canadian Pacific.—Grading is practically finished to Sault Ste. Marie, Mich. On Sept. 24 there were 48 miles of track yet to be laid and ballasted, and work was proceeding at the rate of 1½ miles a day. The bridge at the Sault to be used by the Canadian Pacific, the Minneapolis, Sault Ste. Marie & Atlantic, and the Duluth, South Shore & Atlantic jointly, will be ready for trains in November. The Minneapolis and the Duluth lines are both to be completed to the Sault this fall, completing two new routes from the Northwest to the sea.

Cape Fear & Yadkin Valley.—This company has undertaken the commendable enterprise of collecting an exhibit of agricultural products, minerals, ores, woods and manufactured articles, and, in fine, of everything of commercial interest that is raised, found or made along the line of the road, for the purpose of attracting the attention of investors and settlers. The company has a well lighted room, 40 ft. square, over its passenger station at Greensboro, where a creditable exhibit can be made. It is believed that it will be visited by large numbers of persons passing through Greensboro and result in much good to the contributors, as well as to the road.

A cargo of 1,500 tons of steel rails arrived at Wilmington, N. C., from England last week. The rails will be used to complete road from Greensboro to Mt. Airy, N. C.

Central Iowa.—The Boston committee, represented by Elijah Smith, has succeeded in securing another postponement of the sale of this road to Oct. 21.

Central Vermont.—The first span, 150 ft. long, of the new iron bridge over White River, Vt., was put in place this week.

Work was begun last week on this company's road from Williamstown to Barre, Vt.

Chamber's Valley & New River.—Wythe County, Va., will vote on Oct. 6 on the question of subscribing $100,000 to this company. If the subscription is voted the road will be built at once. It is to connect the Cape Fear & Yadkin Valley and the Cripple Creek railroads, and will be 45 miles long.

Chicago, Milwaukee & St. Paul.—The Iowa Commissioners have entered suit against this company and the Illinois Central to enforce their late decision to compel these roads to switch cars for other competing roads, which decision has been ignored by the two companies.

Chicago & Northwestern.—The extension of this company's Dakota Central road from Faulkton, Faulk County, Dak., to Gettysburg, Potter County, was opened for business on Sept. 26. The distance is 43 miles.

Cincinnati, Jackson & Mackinaw.—The extension from New Carlisle, O., on the Cincinnati, Hamilton & Dayton to Franklin on the Cleveland, Columbus, Cincinnati & Indianapolis, 2 miles, is now under way. A bridge 500 feet long must be built.

Columbus & Eastern.—On application of the Chicago, Wilmington & Vermillion Coal Co., an order has been issued requiring Receiver Picard of this road to file a statement and account. Under the Court's authority he has issued nearly a million dollars in Receiver's certificates in extending and equipping the road. The complainant is a creditor for coal cars furnished.

Columbia, Newberry & Laurens.—The company has given the contract for the piers of the bridge across the Broad River, S. C., to C. D. Langhorn, of Richmond, Va.

Concord.—It is reported that one result of the railroad fight in the New Hampshire Legislature will be the building of an extension from Parker's Station on the Manchester & North Ware through New Boston and Francestown, to Greenfield. The line would be 17 miles long and would create considerable local business for the Concord road.

Covington & Macon.—A bill has been filed by several claimants, whose total claim is only $1,600, asking that a receiver be appointed. A. Craig Palmer has been appointed temporary receiver. The hearing is set for Oct. 13.

Dayton & Ironton.—A tunnel on this road, 13 miles, from Wellston, O., caved in last week, killing two men.

Denison & Washita Valley.—At a meeting in Denison, Tex., last week, it was decided to build this road to the Red River within the next 90 days, so that the company may hold its charter.

Denver, Memphis & Atlantic.—The headquarters and car shops of this company have been located at Winfield, Kan.

Denver & Rio Grande.—The company will be operating its Glenwood Springs, Col., line in a few days. The tunnel, 1,300 ft. through the mountains, is about completed. Glenwood Springs will be made the terminus of the road.

Duluth, South Shore & Atlantic.—The company is making extensive preparations to handle the ore traffic. New docks are to be built at Marquette and at L'Anse. The rolling stock is being added to and improved. Fifteen Brooks freight locomotives have just been shipped to the company.

Duluth & Manitoba.—This road, which is part of the Northern Pacific system is completed from Duluth to Drayton, Dak., and will reach Pembina, 30 miles north, in about two weeks. It is intended to connect with the Red River Valley road.

Duluth, Red Wing & Southern.—The survey from Duluth to Albert Lea, Minn., is about completed. Grading will commence this fall. A further extension to Sioux City, Ia., is projected.

Fargo & Southwestern.—Tracklaying was completed to Edgerly, Dak., last week, 105 miles from Fargo. This is 22 miles of new track. The road is to be built west next year to a junction with the road building from Aberdeen to Bismarck.

Fitchburg.—The company has brought into use as a double track the 9 miles of line between Pownal, Vt., and Hoosick, N. Y., with the exception of a few yards through a rock cut at North Pownal. The company's double track is now in complete working order from Boston to Hoosick, 161 miles.

Florence, Tuskaloosa & Montgomery.—The survey of this road has been completed from Tuskaloosa to Montgomery, Ala. It is not stated yet when work is to begin.

Fort Plain & Richfield Springs.—The preliminary survey of this road between Fort Plain and Richmond Springs, N. Y., has been completed, but it is said to be probable that the projectors will come to an understanding with the Mohawk & Susquehanna people, who have opposed the building of the former line. Under these circumstances, a compromise line will be built.

Fort Scott, Natchez & New Orleans.—The money to build this road has been secured, and actual work is to begin at Vidalia, Ark., in November, and also at the crossing of the Texas & St. Louis road going north toward Hot Springs. The company was incorporated last January.

Fort Worth & Denver City.—A contract has been let to Daniel Carey for building a branch 14 miles long to Panhandle, Carson County, Tex. The branch will connect there with the Kansas Southern.

Georgia.—Bills have been introduced in the Legislature to incorporate the Gainesville & Columbia and the Columbus & Buena Vista railroad companies.

Grand Rapids & Chicago.—The company has been incorporated at Grand Rapids, Mich., by Hiram A. Fletcher and others. Capital stock, $1,500,000.

Grand Trunk.—The statement is made by *La Presse* (Montreal) that the Grand Trunk intends to build a line to Shippegan harbor, in Gloucester County, N. B. This harbor, which is near the head of Chaleurs Bay, is said to be one of the best on the North American coast. The route proposed is a short line from Montreal to La Chandière Junction; thence in the direction of Edmonston and crossing the Intercolonial at Bathurst. The line is said to be 450 miles in length. Probably its construction is not immminent.

Hamilton Railroad & Lumber Co.—This company, of Hamilton, N. C., is building 15 miles of road.

Helena & Boulder Valley.—Green & Barbour, of Helena, Mont., have received a contract for building 40 miles of this road which is projected from Boulder to Red Bluff, Mont., 70 miles.

Illinois Central.—It is stated that this company has fully decided to build from Le Mars, Ia., to Yankton, Dak. President Jeffries has notified the Yankton Board of Trade to that effect.

The company will build a depot at Dubuque, Ia., to cost $75,000.

Ingalls, White Rapids & Northern.—This road, running from Ingalls, Mich., to the Menominee River, has been sold to Oshkosh (Wis.) parties.

Intercolonial.—This road is preparing for carrying the Asiatic mails to Halifax through the winter. New rails have been laid for 120 miles, and snow sheds and other provisions against snow have been made. Altogether $150,000 will be spent in these betterments made to insure regular service, without the usual winter delays.

Kansas City, Memphis & Birmingham.—The road will be completed to Birmingham, Ala., this week. In connection with the Kansas City, Fort Scott & Gulf it gives a through line to Kansas City, Mo.

Kansas City & Southern.—Snellbacker & Gillman, of Kansas City, Mo., have the contract for building this road from Kansas City to East Lynne, Mo., 45 miles. The bridging contract is let to the Kansas City Bridge & Iron Co. Several miles of the road are already graded, and track will be laid on that part at once. The road now extends from Osceola to East Lynne, 70 miles.

Kentucky & South Atlantic.—H. E. Huntington, of Covington, Ky., has bought this road, which extends from Mt. Sterling, Ky., to Frenchburg Junction, 23 miles. He expects to extend the road.

Knoxville Belt Line.—This company has filed articles with the purpose of building railroads in Tennessee.

Lehigh Valley.—Smith & Ripley, 61 Broadway, New York; Chas. McFadden, Philadelphia; John McGovern, Towanda, Pa., and Broadhead & Hickey, Scranton, Pa., have been given contracts for building a line from Pittston to Laurel, Pa. The road will cost $300,000.

Louisiana & Arkansas.—Catahoula County voted this week against the proposition to subscribe a 5 mill tax for ten years in aid of this road from Brinkley, Ark., to Alexandria, La.

Louisville, New Albany & Chicago.—It is reported that the company will build a branch from the main line to Brazil, Ind., tapping the coal fields of Indiana.

This company will construct a line from Bennettsville to Cementville, Ind.

Memphis & Charleston.—The freight conductors and brakemen went on strike last week because of a reduction of the train crews and the refusal of the company to advance the wages of the men composing the reduced force.

Meriden & Waterbury.—The management of this Connecticut road expect to have construction trains running this week and regular trains by Dec. 1.

Mexican National.—The contracts for the completion of the southern end of this road to San Luis Potosi have been awarded. Work begins within 30 days, and is to be finished by September, 1888.

Milwaukee, Lake Shore & Western.—It is said that the company has concluded to build southwestward to Winona, Minn., to meet the Winona & Southwestern.

Minneapolis, Sault Ste. Marie & Atlantic.—A large force of graders are at work on the extension from Gagen, Wis., to Gladstone, Mich. Work has commenced on the shops and docks at the latter place.

The company is erecting its car shops at Sandy Lake, Minn. Twelve buildings will be completed this season.

Minnesota & Northwestern.—Work is being pushed between Dubuque, Ia., and Freeport, Ill. Men are working at four different points on the tunnel. The company expects to have trains running through it by the middle of next January. On the southwestern extension of the road, from Des Moines to Kansas City, about 80 per cent. of the grading has been completed; tracklaying is finished for 40 miles from Des Moines, and is progressing at the rate of 2½ miles a day.

Work progresses steadily on the road between Aiken and Dunbar, Ia. The distance is 50 miles, and 27 miles are now completed from Dunbar, and 2 miles of track is laid out of Aiken. The latter place is 14 miles from Dubuque.

Mobile & Dauphin Island.—All work has been stopped on this road. The line is one that has been under contract for some time, and is projected from Mobile, Ala., to Dauphin Island.

Nashville, Chattanooga & St. Louis.—It is reported that this company will build a branch from Huntington to Milan, Tenn.

New Roads.—The Los Angeles, Cal., Board of Trade has pledged its support in carrying out the plans for a road between Los Angeles and Salt Lake City, Utah. The projectors of the line live in Salt Lake City.

The route of a proposed road has been surveyed between Montgomery and Florence, Ala.

New York & Boston Rapid Transit.—At a meeting in Boston this week, there were present: The President, Gov. Bodwell, of Maine; Vice-President, J. Gregory Smith, President Central Vermont; Gen. Stark, of New Hampshire; D. C. Linsley, President Canada Atlantic and Managing Director Rapid Transit Co. Also Hon. L. E. Chittenden, company's solicitor. Proposed combinations with other connecting and competing railroads were discussed.

New York, Chicago & St. Louis.—The final arrangements for the consolidation of the various companies in the different states were consummated last week. D. W. Caldewell has applied to the court for his discharge as Receiver, in order that the property may be turned over to the new company this week.

New York, Pennsylvania & Ohio.—The company is making a preliminary survey for a new entrance into Cleveland, O. It is to avoid the heavy grade for outgoing trains between Cleveland and Randal. Instead of building the proposed double track to parallel the present one a line will be laid out on an easier grade. This will join the main line again about 2 miles from Solon, and from there the second track will be continued along the present line to Youngstown.

Northwest Central.—The contract for 50 miles of this road west from Brandon, Manitoba, has been let to Sproule Bros., of Winnipeg.

Northern Pacific.—Track on the Duluth & Manitoba extension has been completed from Grand Forks north to Grafton, Dak., 46 miles. It is 40 miles from the International boundary. On the La Moure & Missouri River, owned by this company, track has been laid from La Moure, Dak., west to Edgerley, 21 miles.

Acting Secretary of the Interior Muldrow has denied the motion filed by this company for a reversal of the department decision of Aug. 15, 1887, in the matter of restoring to the public domain land heretofore within the indemnity limits of the railroad.

North & South Short Line.—The bill introduced in the Georgia Legislature to incorporate this company has become a law. The road will extend from Augusta, Ga., to the Florida state line. Capital stock of company, $1,000,000.

Oregon & California.—The road is being pushed to completion as rapidly as possible. The grading work in the Siskiyou Mountains, in northern California, will be completed next month, and only about 100 ft. remain to be bored to complete the Summit tunnel. Trains will be running beyond the Oregon line by Nov. 1. Through connection between Portland, Oregon, and San Francisco is expected to be established by the middle of December.

Pacific.—The Pacific Railroad Commission met in New York again on Sept. 28. Isaac E. Gates, ex-Auditor of the Central Pacific road, was examined.

Paducah, Chickasaw & Birmingham.—Incorporated to build a road from Chickasaw to Birmingham, Ala. Capital stock, $500,000.

Pennsylvania.—The statement of the business of all lines east of Pittsburg for August, as compared with the same month last year, shows an increase in gross earnings of $496,622; an increase in expenses of $434,131; an increase in net earnings of $62,491. The eight months of 1887, as compared with the same period of 1886, show an increase in gross earnings of $3,854,875; an increase in expenses of $2,644,712; an increase in net earnings of $1,210,163. All lines west of Pittsburgh and Erie for the eight months of 1887 show a surplus over all liabilities of $779,947, being a gain as compared with the same period of 1886 of $953,711.

This company has made a traffic contract with the Philadelphia & Reading, by which the latter will use the tracks of the nearly completed Shenandoah branch of the Pennsyl

vania's Schuylkill Valley road, and in return the Pennsylvania will use the Reading's track from Newcastle to Frackville, Pa.

During the week of the Constitutional Centennial Celebration the road carried to and from Philadelphia 588,000 passengers. This is about 7.4 per cent. above an ordinary week's traffic, indicating that this road alone contributed some 125,000 to the throngs that were there.

Philadelphia & Reading.—Mayor Hodges, of Baltimore, has recommended the acceptance of this company's offer for the city's interest in the Susquehanna & Tidewater Canal. The offer is $11 a share in third preferred income bonds.

Pine Bluff, Monroe & Texas.—The route of this road is now being surveyed from Monroe to Pine Bluff, Ark. The construction of the road is expected to greatly assist in developing South Arkansas and the border Louisiana counties. The capital necessary for building the line is understood to have been secured.

Port Arthur, Duluth & Western.—Work will commence at once on this road. The contract for the first 40 miles from Port Arthur (Canada) to the mines has been let to Grant & Ross. This part is to be finished by Aug. 1, 1888. The chief promoters of the enterprise are Sir Alexander Galt, Thomas Marks, of Port Arthur, and Alex. McEwin, of London, Eng. Bonds will soon be issued.

Quincy & Rock Island.—This recently incorporated company has secured right of way from Nauvoo, Ill., through Hamilton and Warsaw to Quincy, Ill.

Rainy Lake River & Southwestern.—The survey is completed from the mouth of Rainy River to Pelan's Crossing of two rivers, 35 miles east of Hallock, Minn., thence southwest to the St. Paul, Minneapolis & Manitoba road near Argyle.

Red River Valley.—The injunction case brought by the Dominion Government against this company came up last week and was postponed until Oct. 7. In the meantime the road cannot be built across the ground in dispute.

St. Louis, Arkansas & Texas.—Tracklaying has begun from Corsicana, Tex., and will be completed to Hillsboro in three weeks.

St. Paul & Duluth.—The improvement of roadbed and lowering of grades will be completed Nov. 15. A new cut-off from St. Paul to White Bear Lake, Minn., is to be built next spring.

St. Paul, Minneapolis & Manitoba.—The company began running through trains from St. Paul to Ft. Assiniboine, Mont., on Sept. 25. Track will be completed to Great Falls, Mont., Oct. 9. This will be 565 miles of road built in five months. The grade between Huron, Dak., and Watertown, Dak., 68 miles, is to be completed Nov. 1.

On the Park River, Dak., extension of this road 15 miles had been laid up to last week. On the Moorhead and Wahpeton line 18 miles had been laid.

San Antonio & Aransas Pass.—This company will extend its line from Comfort, Kendal County, Tex., to Llano, 60 miles.

San Diego & Cuyamaca.—This company has been incorporated to build a road from San Diego to Julian, Cal. Capital stock, $1,000,000.

San Francisco & Joaquin Valley.—This company has been incorporated in California. It proposes to build a road from a point at or near Antioch to a point at or near Rogers, an estimated distance of 380 miles, through the counties of Contra Costa, Alameda, San Joaquin, Stanislaus, Fresno, Tulare and Kern. It is stated that the company has already commenced work in the Tejon Pass. Its capital stock is placed at $10,000,000.

Santa Rosa, Sebastopol & Green Valley.—Grading will be commenced at once on this road, which is projected to run from Santa Rosa, Cal., westward to Sebastopol, and thence to a connection with the San Francisco & North Pacific, 15 miles.

Schenectady & Ogdensburgh.—The company has executed a mortgage to the American Trust & Loan Co., of New York, in security of an advancement of $5,000,000, to be used in the construction of the road. The mortgage is signed by James C. Jewett, of New York, Vice-President, and by the directors. The stock of the road is $6,000,000.

Southern Kansas.—The company has track laid 146 miles from Kiowa, Kan., and the road is opened for business to Canadian, Tex.

Southern Pacific.—The company is securing right of way for the line from Huron to Warthau, Cal. The line will be built in about two weeks.

The company is surveying a line from the Carbon Hill coal mines in Washington Territory to the Carbon River.

About 400 men are at work on the construction of the road northward from Santa Barbara, Cal. The bridge across the Santa Barbara River has been completed.

The damages caused by the floods in Arizona have been repaired and through trains were started on the 27th.

Spokane, Lewiston & Saw Tooth.—This is the title of an intended narrow gauge road to extend from Spokane Falls, Wash. Ter., to the silver mines of the Saw Tooth Mountains. Its manager, John McGillicudy, says that he hopes to get the grading started within the next 60 days. It will be a pretty long road if built to its projected limitations, quite 200 miles, in fact. There are about 2,000 miners at work along the route it hopes to be built upon.

Tehuantepec.—The Eads Concession Company, to build the Tehuantepec Ship Railway, will apply to the state of New York for a charter.

Tennessee Midland.—Davidson County, Tenn., voted last week on the question of granting a subscription to this company. It required a three-fourths affirmative vote for the subscription to carry, and this it did not get. It is likely that another election will be held within 30 days.

Thomasville, Tallahassee & Monticello.—The company asks bids for building 12 miles of road south from Thomasville, Ga. Address H. S. Haines, Chief Engineer, Savanah, Florida & Western Railroad, Savannah, Ga.

Toledo, Thorntown & St. Louis.—This road was first projected in 1871, but, after right of way was obtained and work commenced, it was abandoned because the money gave out. It is now stated that Eastern capital has been interested and that contracts for building are already let and rails bought for the first 50 miles of road. The route is from Fort Wayne, Ind., to Marion, thence through Port Isabel, Windfall, Tipton, Thorntown, Crawfordsville and Eugene, to St. Louis, Mo.

Tuskaloosa & Northern.—The contract for the substructure of the bridge across the Warrior River, 9 miles from Tuskaloosa, Ala., on this road has been let to Riley & Goode, of Atlanta, Ga.

Walden's Ridge.—McDonald & Shea, of Knoxville, Tenn., have been given the contract to build a road from Oliver's Springs to Clinton, Tenn.

Warrior Coal Fields.—It is stated by Chief Engineer Gallup, of this road, which is now under construction from Meridian, Miss., to Decatur, Ala., that it is very likely the company will consolidate with the Pensacola & Memphis. Should such prove the case, work will be commenced immediately at Pensacola, Fla.

Western Indiana.—The directors met last week to consider the construction of the new viaduct in Chicago. This viaduct will be of iron and is to be 400 ft. in length, with three spans, one of 230 ft. being over the Western Indiana tracks, another of 40 ft. over the other tracks, and another of 130 ft. over the Atchison, Topeka & Santa Fe tracks. It is to be completed by May 1, 1888. Bids are to be advertised for at once. The following committee were chosen to look after the construction of the bridge: Messrs. James D. Carson, F. Broughton, O. S. Lyford, S. A. Miller and C. M. Osborne.

Willmar & Sioux Falls.—The road has been formally transferred to the St. Paul, Minneapolis & Manitoba. Some 2,000 men are now at work grading in western Minnesota, and the grade is expected to be completed by January.

TRAFFIC AND EARNINGS.

Ticket Commissions at San Francisco.

The Transcontinental Passenger Association, composed of the passenger agents in San Francisco, has adopted a set of rules to govern the payment of commissions. The agreement provides that the rate on Missouri River first-class tickets shall be $3, on second-class $2, and on round trips $3, half of which must be paid by each line when the return is over a different route from the going portion. A fund of $500 is provided for the settlement of fines, and provision is made for arbitration of disputed questions.

Nebraska Freight Rates.

The Nebraska State Board of Transportation which has investigated local freight rates on complaint of shippers that bills were exorbitant, has issued a peremptory order to the Chicago & Northwestern directing the road to reduce its tariffs to conform to the lists of "reasonable rates" issued by the Board. The dispatches state that these are 33⅓ per cent. lower than prevailing local rates, and that if the order is complied with it will probably force many reductions on other roads. The company will, it is stated, probably contest the decision in the courts.

Passenger Rate Cutting.

Various roads are making very low excursion rates to St. Louis for the Grand Army Encampment, and seem to be glad of opportunities to vary the monotony which uniform and regular rates engender. The scalpers generally find some chance for speculation on these low priced tickets, and some of the dispatches have an appearance of being scalpers' feelers. The Pennsylvania lines are said to be taking passengers from interior Ohio points to St. Louis and back at considerably less than one cent a mile for the distance traveled.

Illinois Freight Rates.

The conference between the railroads and the merchants which was arranged at the time of the hearing before the State Commission, was held at Peoria, Sept. 22. The railroad men agreed to go over the rates and to revise them so as to remove all cause for complaint, it being thought that this could be done without entering upon sweeping or general reductions. Both parties united in a request to the Commission to suspend all consideration of the complaints that have been filed.

Advance in Grain Rates.

The Chicago, Milwaukee & St. Paul has given 10 days notice of an advance in grain rates from points west of the Mississippi River between La Crosse and St. Paul. The rate from those points has heretofore been 7½ cents per 100 lbs., the same as from St. Paul. According to the notice given the St. Paul now means to make the rate from those points 12½ cents. The proposition was made to the other roads interested in that traffic to also advance their rate, but they declined to take such a step. The Minneapolis & St. Louis is said to be the only line inclined to follow the example of the St. Paul, provided other competing roads could be induced to do likewise.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of August:				
Buff., N. Y. & P..	$290,012	$257,723	I. $32,289	12.5
Net	99,159	74,711	I. 24,448	32.7
C. R. R. & Bank Co. of Ga.	498,015	451,891	I. 46,124	10.2
Net	171,459	62,526	I. 108,933	174.2
C., St. L. & P.	466,824	439,287	I. 60,537	13.7
Net	147,836	127,315	I. 20,621	16 1
Cleve. & Cant.	33,097	35,229	D. 2,132	6.0
Net	12,516	9,196	I. 3,320	36.1
Det., B. C. & Al.	52,805			
Net	20,786			
Ft. W. & Den. C.	68,039	37,599	I. 30,440	80 9
Net	33,883	15,726	I. 18,157	121.6
Keok. & West	30,870	28,207	I. 2 663	9.4
Net	13 124	5,316	I. 7,808	147.3
Mar., Col. & Nor.	7.189	2,624	I. 4,565	175.5
Net	3 267			
Nash., C. & St. L.	272,481	224,487	I. 47.994	21.3
Net	125,899	93,697	I. 26 193	26 2
N. Y., Sus. & W.	131,474	94,846	I. 36,628	39.6
Net	39,832	39,039	I. 20,793	53.3
Phila. & Read	2,055,704	1,801,207	I. 254,557	13 5
Net	1,127,465	760,029	I. 367,436	48.3
P. & R. C. & I. Co.	1,979,716	1,501,420	I. 478,296	31.8
Net	233,273	Def. 181,541	I. 414,814	
Month of August:				
Bur., C. R. & No.	237,633	246 435	D. 8,802	3.5
Cap - F. & Y. V.	22,352	20,248	I. 2,104	10.8
Cen. of Georgia.	498,015	451,891	I. 46,124	10.2
Chi., St. L. & P.	489,824	439,287	I. 60,537	13.7
Chi. & Ind. Coal.	37,512	15,647	I. 21,865	140.1
Chi. & W. Mich.	128,313	127,138	I. 1,175	.9
Chic. & N. W.	2,609,794	2,328,475	I. 281,319	12.0
Cin., N. O. & T. P.	278,691	250,965	I. 27,726	11.0
Ala. Gt. South.	129,617	97,756	I. 31,861	32.5
N. Ori. & N. E.	44,785	39,111	I. 5,674	14.5
Vicks. & Mer.	37,567	37,213	I. 354	.9
V., Shre. & P.	39,502	39,883	D. 381	.9
Total, C., N. O. & T. P.	530,162	466,928	I. 65,234	14.0
Cleve. & Canton.	33,097	35,229	D. 2,132	6.0
E. Ten., Va. & G.	425,057	347,292	I. 77.765	22.3
Den. & R. Gran.	113,300	89,350	I. 23 950	26.7
Georgia Pacific.	104,858	67,853	I. 36,805	54.2
K. C., Ft. S. & G.	221,611	198,186	I. 23,425	11 7
K. C., Sp. & Mem.	159,750	130,123	I. 29,627	22.7
K. C., Cl. & Spr.	22,148	20,843	I. 1,305	6.2
Lehigh & H. R.	23,143	20,813	I. 2,330	11.2
Louis., N. O. & T.	130,059	109,180	I. 20,879	19.1
Miss. & Tenn.	32,271	26,385	I. 5,886	22.2
Nash., C. & St. L.	272,481	224,487	I. 47,994	21.3
N. Y., Sus. & W.	131,474	94,846	I. 36,628	38.6

Seven months—Jan. 1 to July 31.	1887.	1886.	Inc. or Dec.	P.c.
Atch., T. & S. F.	$10,626,537	$8,244 478	I. $2,382.059	28.8
Net	4,872,863	3,602,526	I. 1,270,337	35.2
Cairo, V. & Chic.	413,725	351.128	I. 62,597	17.8
Net	117,248	77,074	I. 40,174	52.1
California South.	839,772	304,946	I. 474,826	130.1
Net	371,372	Def. 32,825	I. 404,197	....
Cape F. & Y. V.	19,429	14,542	I. 4,887	33.7
Net	8,591	4,750	I. 3,841	80.0
Ches. & Ohio	2,449,192	2,225,327	I. 223 865	10.0
Net	728,690	638,790	I. 89,900	14.0
Eliz., Lex. & B. S.	582 721	489,322	I. 93,399	19.0
Net	186,631	161,215	I. 25,416	15.1
Ches., O. & S. W.	174,852	147,418	I. 27,434	18.6
Net	78,472	61,007	I. 17,465	28.6
Chi., Bur. & Q.	15,443,908	13,854 100	I. 1,589.808	11.4
Net	6,965,454	6 013,687	I. 952,367	15 8
Chi., Bur. & No.	1,432.125			
Net	366,163			
Chi., Mil. & St. P.	13,039,957	12,674,602	I. 365,355	2.9
Net	4,358,449	4 339,639	I. 18,810	.4
Cl., C., C. & I.	2,424,711	2,167,359	I. 257.352	11 8
Net	867,467	703,372	I. 164,095	23.3
Den. & R. G.	4,234 707	3,490,024	I. 743,683	21.3
Net	1,697,976	1,175,384	I. 522,592	44 4
Det., B. C. & Al.	270,059	118 212	I. 151,847	123.3
Net	129,450	62,560	I. 66,890	106.8
E. Ten., Va. & G.	2,809,069	2,222 412	I. 586,657	26.3
Net	717 444	631,620	I. 85,824	13.5
Kentucky Cent.	564 309	485,405	I. 78,904	16.2
Net	220,584	160,408	I. 60,176	37.5
Lou., N. O. & T.	1,036 079	842,141	I. 193,938	23.0
Net	247,177	156,049	I. 91,128	58.4
Mil., L. S. & W.	1,777 925	1,191,212	I. 586,713	49.2
Net	770,647	514 962	I. 255,685	49.6
Minn. & N. W.	613,028	223,013	I. 390,015	174.9
Net	172,074	79,086	I. 92,988	117.5
Minn. & St. L.	835,653	806,163	I. 29,490	3.6
Net	205,441	206,869	D. 1,428	.6
Northern Pacific.	6,649,730	6,087,281	I. 562,447	9.2
Net	2,460,423	2,704,773	D. 244,350	9.0
Ohio & Miss	2,214,016	2,066,151	I. 147,865	7.1
Net	712,606	534,920	I. 177,686	33.2
Oregon Imp. Co.	2,180,795	1,541 127	I. 639,668	41.5
Net	546,986	339,361	I. 207,625	61.1
Oregon R. & N. Co.	2,681,283	2,733,194	D. 71,911	2.6
Net	1,092,789	1,101,498	D. 8,709	.7
Penn. Western Lines:				
N'west. Sys.	9,911,700	8,406 477	I. 1,505,223	17.9
Net	3,313,560	2 857,922	I. 455,638	15.9
S'west. Sys.	7,764,088	6,344,222	I. 1,429,866	22.5
Net	1,976,914	1,262,023	I. 714,891	56.6
Tot. W. Pitts.	17,675,788	14,740,699	I. 2,935 089	19.9
Net	5,290,474	4,119,945	I. 1,170,529	28.4
Gal., H. & S. A.	1,810,397	1,469 915	I. 340,482	24.1
Net	208,368	158,109	I. 50,259	31.7
Louisia. & West.	452,416	357,267	I. 95,149	26.6
Net	203,001	177,097	I. 25,904	14.6
Morgan's L. & T.	2,239,407	2,249 967	D. 10,560	.4
Net	366,180	491 488	D. 125,308	25.4
N. Y., Tex. & Mex.	92,063	78,341	I. 13,722	17.5
Net	2,449	Def. 8,960	I. 11,409	
Texas & N. O.	686,874	548,383	I. 138,491	25.2
Net	305,078	232,840	I. 72,238	31 0
Tot. A. t. Sys.	5 281,158	4,701,873	I. 577,285	12.2
Net	1,085,077	1,050,572	I. 34,505	3.2
Tot. Pac. Sys.	14,058,836	12,771 690	I. 1,287,146	10 0
Net	6,301,916	6,345,628	D. 43,712	.6
Tot. So. Pac. Co.	19,339,994	17,475,563	I. 1,864,431	10.6
Net	7,386,993	7,390,200	D. 9,207	1
Tol. & Ohio Cen.	551,023	421.907	I. 129,116	30.6
Net	169,021	121,195	I. 47,826	39.4
Wabash Ry.	3,689,304	3,595,899	I. 893,405	2.5
Net	1,202,389	747,256	I. 455,133	60.9
Total (gross)	$132,476,560	$116,069,190	$16,407,370	14.1
Total (net)	41,577,711	35,620,721	5,956,990	....
			D. 283,694	....
Net			I. 5,693,296	15.9

Eight months—Jan. 1 to August 31:				
C. R. R. & Bank Co. of Ga.	3,658,358	3,491,132	I. 167.226	4.9
Net	982.179	758,151	I. 224,028	29.5
Chi., St. L. & P.	3,699,578	3,007,547	I. 692,031	23.0
Net	946,548	401,855	I. 534,693	133.0
Cleve. & Canton	234,635	228,804	I. 5,831	2.5
Net	60,999	50,542	I. 10,457	20.7
Nash., C. & St. L.	1,985,638	1,520,545	I. 465,093	30.5
Net	895,752	609 577	I. 286,175	46.9
N. Y., Sus. & W.	867,140	696.474	I. 170.666	24.5
Net	389,645	290.615	I. 99,030	34.0

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Cotton.

The cotton movement for the week ending Sept. 23 is reported as below, in bales:

Interior markets:	1887.	1886.	Inc. or Dec.	P. c.
Receipts	116,697	65,575	I. 51,122	77.9
Shipments	86,655	57,703	I. 28,952	50.1
Stock	82,554	58,734	I. 23,820	40.5
Seaports:				
Receipts	187,740	106 601	I. 81,139	76.1
Exports	58,718	44,373	I. 14.345	32.3
Stock	299,139	262,728	I. 36,411	13.8

Coal.

The coal tonnages for the week ending Sept. 24 are reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite	634.213	753.744	D. 121,531	16.2
Bituminous	282,884	282,889	I. 26,995	10.2

The coal tonnages of the Pennsylvania road for the week ending Sept. 17 are reported as follows:

	Coal.	Coke.	Total.
Line of road	196 072	87,534	283,606
Year to Sept. 17	7,273,293	2,427,089	9,700,382
To Sept. 17, 1886	5,944,659	2,448,308	8,392,967

Cumberland coal shipments for the week ending Sept. 24 amounted to 68,233 tons, and for the year to that date 2,287,393 tons.

East-bound Shipments.

The total movement of flour, grain and provisions from Chicago eastward to seaboard points amounted last week to 26,602 tons, against 25,979 tons for the week previous, an increase of 623 tons. The percentages carried by the various roads were as follows: Chicago & Grand Trunk, 15.0 per cent.; Michigan Central, 27.6; Lake Shore & Michigan Southern, 16.4; Pittsburgh, Fort Wayne & Chicago, 17.2; Chicago, Pittsburgh & St. Louis, 3.3; Baltimore & Ohio, 8.2; New York, Chicago & St. Louis, 9.3.

Canadian Exports.

The value of Canadian exports for the month of August was $10,102,107, against $9,539,901 in August last year, and for the first two months of the fiscal year the gain is $991,400. Agricultural products exported have fallen off greatly. The greatest gains were in animals and animal products, and in manufactures.

Ticket Commissions on the Trunk Lines.

The Chicago, Rock Island & Pacific has now agreed to the conditions of all the trunk lines, except the Pennsylvania, and they are selling tickets over the Rock Island road. The Missouri Pacific has agreed with all the trunk lines on this question.